



The Commonwealth of Massachusetts

DEPARTMENT OF PUBLIC UTILITIES

PIPELINE ENGINEERING AND SAFETY DIVISION

INCIDENT REPORT

22 Manning Street, Reading Massachusetts

January 25, 2010

PIPELINE ENGINEERING AND SAFETY DIVISION

Accident File

Location: 22 Manning Street, Reading Massachusetts

Date of Accident: January 25, 2010

Gas Company: Boston Gas Company, Essex Gas Company,
and Colonial Gas Company each d/b/a National Grid

Estimated Property Damage: *\$250,000

Injuries: One

Report Issued – November 26, 2012

* Estimated by National Grid

Table of Contents

I.	INTRODUCTION.....	1
A.	Scope of Investigation	1
B.	Overview of Incident	2
II.	THE DEPARTMENT'S INVESTIGATION	3
A.	Description of the Site	3
B.	Description of the Scene	4
C.	Leak Detection.....	5
1.	Post Incident Leak Surveys and Repairs	5
2.	Pre-Incident - Winter Patrol Surveys	5
D.	Pressure Test of the Service Line.....	5
E.	Odor Calls and Leak Repairs.....	6
F.	Odorization	6
III.	ANALYSIS OF THE PIPE SAMPLES	7
IV.	FINDINGS AND CONCLUSIONS.....	8
A.	Findings	8
B.	Conclusions.....	9

EXHIBIT LIST

1. Exhibit 1: DOT Incident Report Submitted by National Grid
2. Exhibit 2: Reading Fire Department Report
3. Exhibit 3: National Grid Report on its Investigation of the Incident
4. Exhibit 4: State Fire Marshal Report
5. Exhibit 5: Photographs of the Incident
6. Exhibit 6: Summary of Records of Gas Mains
7. Exhibit 7: Leakage Survey Maps
8. Exhibit 8: Post-Incident Reported Leaks and Repairs
9. Exhibit 9: Winter Patrol Leak Surveys 2005 to 2010
10. Exhibit 10: Pressure Test of Service to 22 Manning Street, Reading
11. Exhibit 11: Summary of All Leak Surveys from 2005 to 2012
12. Exhibit 12: Odorant Level Tests

I. INTRODUCTION

A. Scope of Investigation

The Massachusetts Department of Public Utilities ("Department"), Pipeline Engineering and Safety Division ("Division"), pursuant to G.L. c. 164, § 105A, and a Federal Certification Agreement as provided for in 49 U.S.C. § 60105, has investigated a natural gas ("gas") release at 22 Manning Street, Reading, on January 25, 2010 ("Incident").¹ The release of gas contributed to an explosion, and over \$250,000 in property damage to the dwelling, as estimated by the Operator of the natural gas facilities, Boston Gas Company and Colonial Gas Company d/b/a National Grid ("National Grid" or "Operator") (Exh. 1). One individual was injured (Exh. 2).

As part of the Department's annual certification process by the United States Department of Transportation ("U.S. DOT"), the Department must report to the U.S. DOT each accident or Incident . . . involving a fatality, personal injury requiring hospitalization, or property damage or loss of more than an amount the

1 "Incident" means any of the following events:

(1) An event that involves a release of gas from a pipeline, or of liquefied natural gas, liquefied petroleum gas, refrigerant gas, or gas from an LNG facility, and that results in one or more of the following consequences:

- (i) A death, or personal injury necessitating in-patient hospitalization;
- (ii) Estimated property damage of \$50,000 or more, including loss to the operator and others, or both, but excluding cost of gas lost;
- (iii) Unintentional estimated gas loss of three million cubic feet or more;

(2) An event that results in an emergency shutdown of an LNG facility. Activation of an emergency shutdown system for reasons other than an actual emergency does not constitute an incident.

(3) An event that is significant in the judgment of the operator, even though it did not meet the criteria of paragraphs (1) or (2) of this definition.

Secretary establishes... and any other accident the [Department] considers significant, and a summary of the investigation by the [Department] of the cause and circumstances surrounding the accident or Incident. 49 U.S.C. § 60105(c).

The purpose of this report is to inform the U.S. DOT as to the cause and circumstances surrounding the Incident.

The Department has established procedures for determining the nature and extent of violations of codes and regulations pertaining to safety of pipeline facilities and the transportation of gas, including but not limited to, 220 C.M.R. §§ 101.00 through 113.00. See 220 C.M.R. § 69.00 et seq. The Division also enforces the U.S. DOT safety standards for gas pipeline systems as set forth in 49 C.F.R. Part 192 ("Part 192"). G.L. c. 164, § 105A.

B. Overview of Incident

On January 25, 2010, at approximately 8:00 p.m., National Grid notified the Department of a house explosion and fire at 22 Manning Street, Reading (Exh. 3). The Department dispatched two investigators to investigate the Incident. The Reading Fire Department reported that one person was admitted to the hospital for observation (Exh. 2, at 3). National Grid operates a 6-inch diameter cast iron gas main² located in the vicinity of the intersection of Manning and Pleasant Streets (Exhs. 3, 4).³

The State Fire Marshal's Office determined that the most probable

... cause of this explosion and subsequent fire was a migration of gas vapors from a cracked six-inch gas main on the street through the soil and into the basement. The vapors most likely entered the basement through two sewage

² "Main" means a distribution line that serves as a common source of supply for more than one service line.

³ The leaking gas main was on Pleasant Street, near the intersection of Pleasant Street and Manning street, and in front of the house at 22 Manning Street. The house was at the corner of Manning Street and Pleasant Street.

drain lines as well as the crack in the basement floor. The most likely ignition source . . . was the furnace located in the basement.

(Exh. 4, at 2)

Massachusetts Materials Research, Inc. ("MMR") performed an analysis of the cracked section of gas main and issued a report ("MMR Report"). The report concluded that damage to the cast iron main was believed to have been caused by natural forces associated with temperature changes and subsequent frost heave (MMR Report at 3).

II. THE DEPARTMENT'S INVESTIGATION

A. Description of the Site

Manning Street is in a residential area of Reading with single and two family dwellings. The structure at 22 Manning Street was a 2½ story wood frame structure (pitched roof) with a full basement, and a 1½ story in-law apartment attachment (Exh. 5). The building facade also consisted of wooden clad-board siding, while the foundation was poured concrete (*id.*). The heating system for the house was located in the basement (*id.*). Two (2) sewer line clean-outs were observed in the basement; one sewer clean-out was located adjacent to the boiler unit along the rear wall, while the other was located along the center of the opposite wall which is at the front of building (*id.*). There was also a crack in the concrete slab in the basement floor that ran from the front wall to the back wall (Exh. 4).

The Company reported that the 6-inch diameter cast-iron gas main that underlies Pleasant Street was installed in 1930 (Exh. 6). The portion of the leaking main near the intersection of Manning Street and Pleasant Street was buried four feet deep (*id.*). At the time of the incident, the operating pressure of the gas main was 1.8 pounds per square inch gauge

("psig") (id.).⁴ The MAOP of the system is 2 psig (id.). There was a one-inch plastic gas service supplying gas to 22 Manning Street (id.). The existing gas meter was located outside, on the left side of the house (id.).

B. Description of the Scene

The house at 22 Manning Street, Reading sustained significant structural damage due to the explosion and ensuing fire (Exh. 4). Several exterior walls of the house were pushed out, thus compromising the structural integrity of the building (id.). Interior walls, doors and ceilings also sustained structural damages, while other parts of the house encountered only moderate fire damages (Exhs. 3, 4).

National Grid distribution personnel located the gas leak on the gas main on Pleasant Street - in front of 22 Manning Street - and began excavating in the street to expose the existing cast iron gas main (Exh. 3). At 9 p.m., National Grid exposed the six-inch cast iron main (id.). When the Operator exposed the gas main, it found the main broken, but not completely severed (id.). The break on the main was located directly across the street from 22 Manning Street (id.). The Operator noted that the frost line was approximately twelve inches below the surface (id.).

The Operator cleaned the main, and installed a clamp to secure the leak until permanent repairs were completed—the cracked main was permanently repaired by removing the cracked section of cast iron main, and replacing it was a new segment of plastic pipe (Exhs. 3, 5).

⁴ "psig" refers to the pressure expressed in pounds exerted on one square inch of surface area. The designation "gauge", indicates the readings are already adjusted to ignore the surrounding atmospheric pressure, which is 14.7 psi at sea level. If psig gauge were not connected to any pressure source, it would read zero even though it is actually sensing 14.7 psi at sea level.

At 7 p.m. (before National Grid exposed the main), National Grid detected gas readings that showed 100 percent gas in sewer manholes on both sides of the house, minimal readings at the water service, and one percent gas at 228 Pleasant Street (Exh. 3).

On January 26, 2010, National Grid permanently removed and replaced the section of main that had fractured, and pressure tested the gas service to 22 Manning Street (Exhs. 8 and 10).

C. Leak Detection

1. Post Incident Leak Surveys and Repairs

After the Incident, National Grid initiated a leak survey, which encompassed the surrounding streets of the Incident location (Exh. 7). National Grid discovered and repaired one leak at 228 Pleasant Street (Exh. 8). During the period January 25 to 29, 2010, additional post-incident leaks were reported and repaired (*id.*). The repairs were located on Main, Manning, Pleasant, South and Prescott Streets, Reading (*id.*).

2. Pre-Incident - Winter Patrol Surveys

Prior to the Incident, National Grid had not commenced its Winter Patrol Survey for the 2010 winter season for the affected area (Malden Division) (Exh. 9). Company records indicate that National Grid last conducted winter patrols beginning January 16, 2009 (Exh. 9). The final pass was conducted early spring (March 2009) (*id.*). The Operator did not detect any main breaks or new gas leaks during said period (*id.*).

D. Pressure Test of the Service Line

On January 26, 2010, National Grid pressure tested the one-inch service line supplying gas to 22 Manning Street, Reading (Exh. 10). The service line was pressure tested for 15 minutes at 90 psig — no loss in pressure was observed (*id.*). As such, the gas service was eliminated as one of the possible sources of gas leakage (*id.*).

E. Odor Calls and Leak Repairs

National Grid reported that the homeowner stated to the Reading Fire Department that he smelled gas in the basement about one hour before the Incident, but did not report it to National Grid (Exh. 3). National Grid did not get an odor call for the Incident site (id.).

From December 30, 2005, to the time of the incident on January 25, 2010, the Operator conducted a series of leak surveys within the affected area (Exh. 9). The Operator conducted both walking and mobile leak surveys during said period.

However, according to the Operator's records, located within the affected area was a number of existing Grade 3 leaks that the Operator monitored and rechecked from 2006 to 2009 (Exh. 11). The Grade 3 leaks were located at 97 and 217 Pleasant Street (id.).

F. Odorization

An operator must odorize the gas in its distribution system of sufficient intensity so that the gas is readily perceptible to the normal or average olfactory senses of a person coming from fresh, uncontaminated air, into a closed room containing 0.15 percent gas in air. 220 C.M.R. § 101.06(20). An operator must also conduct periodic sampling of the gas to assure the proper concentration of odorant throughout its system.

National Grid conducts odorant sampling throughout its system on a monthly basis. On January 25, 2010, National Grid personnel performed odorant measurements at three (3) separate locations in the Town of Reading (Exh. 12). These locations were located in close proximity to the incident. The distinct odor level (DOL) results (in percent gas and air) were as follows:

Location	Threshold Level (% Gas in Air)	Distinct Odor Level (% Gas in Air)
Lowell Street (Reading take Station):	0.04	0.10
John @ Haven Street (Regulator Station):	0.03 0.04	0.07 0.09
235 Pleasant Street, Reading	0.05 0.06	0.09 0.10

(Exh. 12)

The odor detection levels indicate that the odorant was within the limit prescribed by the State regulation (*id.*). The odorant levels also met the federal pipeline safety requirement, contained in Part 192, § 192.625, which requires that gas be odorized so that it can be detected at a level of one percent gas and air.

III. ANALYSIS OF THE PIPE SAMPLES

MMR performed an analysis of the cracked section of 6-inch cast iron gas main supplying gas to 22 Manning Street, Reading. MMR issued a report on the results of its analysis ("MMR Report").⁵ The MMR Report at 10-11, noted that:

Although this incident pipe was spun cast, its chemistry (wt. % phosphorous) and metallurgy are more like a pit cast pipe. These in combination with a notable amount of shrinkage porosity resulted in a pipe that would be weaker than the average spun cast pipe and more typical of a pit cast pipe in behavior. Many times, when a spun cast pipe exhibits anomalous microstructure, it is the result of the manufacturing technique of the company that made it.

The MMR Report concludes that:

⁵ Copies of the MMR report can be obtained by contacting: Veda-Anne Ulcickas, Massachusetts Materials Research, Inc., P.O. Box 810, Century Drive, West Boylston, MA 01583

This pipe exhibited a classic transverse fracture due to bending loads. Subsurface soils are not static and their variations along the length of a pipe can produce variable tensile, compressive, and bending loads. Additionally, variations in soil/backfill composition and saturation can affect responses to freeze/thaw cycles and heavy precipitation. A combination of graphitic corrosion, porosity, and anomalous microstructure would have produced a spun cast pipe that was weaker than others more typical of that casting method. This pipe was metallurgically more similar to older pit cast pipes and thus would be more sensitive to soil loading than the average spun cast sample.

IV. FINDINGS AND CONCLUSIONS

A. Findings

1. National Grid operates the natural gas distribution facilities in Reading, MA.
2. A 6-inch diameter cast-iron gas main underlies Pleasant Street, Reading.
3. The maximum allowable operating pressure of the main was 2 psig.
4. The cast iron main on Pleasant Street was installed in 1930.
5. From 2006 to 2009, the Company monitored a number of existing non-hazardous Grade 3 gas leaks at 97, and 217 Pleasant Street.
6. National Grid conducted its first pass of winter patrol surveys in January 2009, and concluded its last pass before the Incident in March 2009.
7. These winter patrol surveys did not detect any main breaks or new gas leaks.
8. The Operator had no records of maintenance or replacement of gas mains within close proximity to 22 Manning Street.
9. The house at 22 Manning Street, Reading had gas service provided by National Grid.
10. The basement of the house at 22 Manning Street, Reading had a sewer line.
11. On January 25, 2010 natural gas was released into 22 Manning Street, Reading, that ignited, and significantly damaged the home.
12. On January 25, 2010, National Grid located a gas leak on the cast-iron gas main in front of 22 Manning Street.
13. On January 25, 2010, the service line to 22 Manning Street did not leak any gas.
14. The operating pressure of the main at the time of the failure was 1.8 psig.

B. Conclusions

The State Fire Marshal Report concludes that gas most likely migrated into the basement of the house from the cracked cast iron main on Pleasant Street - in front of 22 Manning Street - through the soil, into the basement, through the two existing sanitary sewer lines and the cracks in the basement floor. This conclusion is reasonable, and supported by the evidence in this investigation. The most likely point of ignition of the gas was the furnace located in the basement area.

The MMR conclusion that the failed pipe exhibited a classic transverse fracture due to bending loads is reasonable, and supported by the evidence in this investigation. A main cause of bending loads in the soil surrounding this pipe is most likely frost heaves.

EXHIBIT 1

DOT Incident Report Submitted by National Grid

NOTICE: This report is required by 49 CFR Part 181. Failure to report can result in a civil penalty not to exceed \$100,000 for each violation for each day that such violation persists except that the maximum civil penalty shall not exceed \$1,000,000 as provided in 49 USC 60122.

OMB NO: 2137-0522
EXPIRATION DATE: 01/31/2013

U.S. Department of Transportation
Pipeline and Hazardous Materials
Safety Administration

INCIDENT REPORT - GAS DISTRIBUTION SYSTEM

Report Date: _____

No. _____

(DOT Use Only)

A federal agency may not conduct or sponsor, and a person is not required to respond to, nor shall a person be subject to a penalty for failure to comply with a collection of information subject to the requirements of the Paperwork Reduction Act unless that collection of information displays a current valid OMB Control Number. The OMB Control Number for this information collection is 2137-0522. Public reporting for this collection of information is estimated to be approximately 10 hours per response, including the time for reviewing instructions, gathering the data needed, and completing and reviewing the collection of information. All responses to this collection of information are mandatory. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden to: Information Collection Clearance Officer, PHMSA, Office of Pipeline Safety (PHP-30) 1200 New Jersey Avenue, SE, Washington, D.C. 20590.

INSTRUCTIONS

Important: Please read the separate instructions for completing this form before you begin. They clarify the information requested and provide specific examples. If you do not have a copy of the instructions, you can obtain one from the PHMSA Pipeline Safety Community Web Page at <http://www.phmsa.dot.gov/pipeline>

PART A - KEY REPORT INFORMATION

**Report Type: (select all that apply) x Original u Supplemental x Final

**1. Operator's OPS-issued Operator Identification Number (OPID): / 1 / 6 / 4 / 10 /

2. Name of Operator: **Boston Gas Company

**3. Address of Operator:

3.a **40 Sylvan Road**

(Street Address)

3.b **Waltham**

(City) / - / / / / /

3.c State: / M / A /

3.d Zip Code: 02 / 4 / 15 / 1 /

**4. Local time (24-hr clock) and date of the Incident:

/ 1 / 8 / 0 / 6 / / 0 / 1 / 2 / 5 / 2 / 0 / 1 / 0 /
Hour Month Day Year

**5. Location of Incident:

5.a **22 Manning Street**

(Street Address or location description)

5.b **Reading**

(City)

5.c **Middlesex**

(County or Parish)

5.d State: / M / A /

5.e Zip Code: 0 / 1 / 8 / 6 / 7 / / - / / / / /

5.f Latitude: / / / . / / / / / /

Longitude: - / / / / . / / / / / /

**6. National Response Center

Report Number:

/ 9 / 2 / 9 / 6 / 4 / 3 /

**7. Local time (24-hr clock) and date of initial telephonic report to the National Response Center:

/ 2 / 1 / 0 / 0 / , 0 / 1 / 2 / 5 / 2 / 0 / 1 / 0 /
Hour Month Day Year

**8. Incident resulted from:

- ☒ Unintentional release of gas
☐ Intentional release of gas
☐ Reasons other than release of gas

**9. Gas released:

- ☒ Natural Gas
☐ Propane Gas
☐ Other Gas E: Name: _____

Estimated volume of gas

released: _____ / _____ / Thousand Cubic Feet (

<p>**11. Were there fatalities? • Yes X No If Yes, specify the number in each category:</p> <p>11.a Operator employees <u> / / / / / </u></p> <p>11.b Contractor employees working for the Operator <u> / / / / / </u></p> <p>11.c Non-Operator emergency responders <u> / / / / / </u></p> <p>11.d Workers working on the right-of-way, but NOT associated with this Operator <u> / / / / / </u></p> <p>11.e General public <u> / / / / / </u></p> <p>11.f Total fatalities (sum of above) <u> / / / / 0/ </u></p>	<p>**12. Were there injuries requiring Inpatient hospitalization? X: Yes No If Yes, specify the number in each category:</p> <p>12.a Operator employees <u> / / / / 0/ </u></p> <p>12.b Contractor employees working for the Operator <u> / / / / 0/ </u></p> <p>12.c Non-Operator emergency responders <u> / / / / / </u></p> <p>12.d Workers working on the right-of-way, but NOT associated with this Operator <u> / / / / 0/ </u></p> <p>12.e General public <u> / / / / 1/ </u></p> <p>12.f Total injuries (sum of above) <u> / / / / 1/ </u></p>
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****13. Was the pipeline/facility shut down due to the incident?**
• Yes X • No • Explain: _____

If Yes, complete Questions 13.a and 13.b: (use local time, 24-hr clock)

13.a Local time and date of shutdown / / / / / / / / / / / / /

Hour
Month
Day
Year

13.b Local time pipeline/facility restarted / / / / / / / / / / / / /

Hour
Month
Day
Year

• Still shut down*
(*Supplemental Report required)

****14. Did the gas ignite? X Yes • No**

****15. Did the gas explode? X • Yes No**

16. Number of general public evacuated: / / / / / / 3/

17. Time sequence (use local time, 24-hour clock):

17.a Local time operator identified Incident / / 8/ / 0 / 6 / / 0/ 1/ / / 2/ 5/ 2/ 0/ 1/ / 0

Hou
Month
Day
Year

17.b Local time operator resources arrived on site / 1/ 8/ 3/ 7 / / 0/ 1/ / / 2/ 5/ 2/ 0/ 1/ / 0

Hour
Month
Day
Year

PART B - ADDITIONAL LOCATION INFORMATION

1. Was the Incident on Federal land? • Yes X No

2. Location of Incident: (select only one)

- ☐ Operator-controlled property
☐ Public property
X Private property
☐ Utility Right-of-Way / Easement

**3. Area of Incident: (select only one)

X Underground Specify: X • Under soil • Under a building • Under pavement
• Exposed due to excavation • In underground enclosed space (e.g., vault)
• Other _____
Depth-of-Cover (in): 1 1/4

Aboveground Specify: Typical aboveground facility piping or appurtenance (e.g. valve or regulator station, outdoor meter set)
• Overhead crossing
• In or spanning an open ditch • Inside a building
• In other enclosed space • Other _____

- ☐ Transition Area Specify: • Soil/air interface • Wall sleeve • Pipe support or other close contact area
• Other _____

**4. Did Incident occur in a crossing? • Yes X No

If Yes, specify type below:

- ☐ Bridge crossing • Specify: • Cased • Uncased
☐ Railroad crossing • (Select all that apply) • Cased • Uncased • Bored/drilled
☐ Road crossing • (Select all that apply) • Cased • Uncased • Bored/drilled
☐ Water crossing • (Select all that apply) • Cased • Uncased • Bored/drilled

Name of body of water (If commonly known): _____

Approx. water depth (ft): 1 1/4

PART C - ADDITIONAL FACILITY INFORMATION

*1. Indicate the type of pipeline system:

- ☒ Natural Gas Distribution, privately owned
☐ Natural Gas Distribution, municipally owned
☐ Petroleum Gas Distribution
☐ Other .. Specify: _____

**2. Part of system involved in Incident: (select only one) ☒ Main ☐ Service ☐ Service Riser ☐ Outside Meter/Regulator set
☐ Inside Meter/Regulator set ☐ Farm Tap Meter/Regulator set
☐ Station ☐ District Regulator/Metering
☐ Other ☐ Valve

2.a. Year "Part of system involved in Incident" was installed: 1/9/ 3/ 0/ or . Unknown

3. When "Main" or "Service" is selected as the "Part of system involved in Incident" (from PART C, Question 2), provide the following:

3.a Nominal diameter of pipe (in): 1 / 1 / 1 / 6 /

3.b Pipe specification (e.g., API 5L, ASTM D2513): _____

3.c Pipe manufacturer: _____ or . Unknown

3.d Year of manufacture: 1 / 1 / 1 / orx Unknown

4. Material involved in Incident: ☐ Steel ☒ Cast/Wrought Iron ☐ Ductile Iron ☐ Copper ☐ Plastic ☐ Unknown
☐ _____ Other b Specify:

4.a. If Steel .. Specify seam type: _____ or . None or . Unknown

4.b. If Steel .. Specify wall thickness (inches): 1 / 1 / 1 / 1 / or . Unknown

4.c. If Plastic .. Specify type: ☐ Polyvinyl Chloride (PVC) ☐ Polyethylene (PE) ☐ Cross-linked Polyethylene (PEX)
☐ Polybutylene (PB) ☐ Polypropylene (PP) ☐ Acrylonitrile Butadiene Styrene (ABS)
☐ Polyamide (PA) ☐ Cellulose Acetate Butyrate (CAB)
☐ Other _____
☐ Unknown

4.d. If Plastic .. Specify Standard Dimension Ratio (SDR): 1 / 1 / 1 / 1 / or wall thickness: 1 / 1 / 1 / 1 / or . Unknown

4.e. If Polyethylene (PE) is selected as the type of plastic in PART C, Question 4.c.

Specify PE Pipe Material Designation Code (i.e., 2406, 3408, etc.) PE 1 / 1 / 1 / 1 / or . Unknown

5. Type of release involved: (select only one)

☐ Mechanical Puncture b Approx. size: 1 / 1 / 1 / 1 / in. (axial) by 1 / 1 / 1 / 1 / in. (circumferential)

☐ XLeak b Select Type: ☐ Pinhole ☒ Crack ☐ Connection Failure ☐ Seal or Packing Other

☐ Rupture b Select Orientation: ☐ Circumferential ☐ Longitudinal _____ ☐ Other _____

Approx. size: 1 / 1 / 1 / 1 / in. (widest opening) by 1 / 1 / 1 / 1 / in. (length circumferentially or axially)

☐ Other b Describe: Crack found on 6 inch cast iron main . _____

PART D - ADDITIONAL CONSEQUENCE INFORMATION****1. Class Location of Incident: (select only one)**☐ Class 1
Location☐ Class 2
Location☒ Class 3 Location☐ Class 4****2. Estimated cost to Operator :**2.a Estimated cost of public and non-Operator private property damage
paid/reimbursed by the Operator

\$250,000

2.b Estimated cost of gas released

2.c Estimated cost of Operator's property damage & repairs

2.d Estimated cost of Operator's emergency response

2.e Estimated other costs

Describe:

2.f Estimated total costs (sum of above)

\$250,000

3. Estimated number of customers out of service:

3.a Commercial entities / / / / /

3.b Industrial entities / / / / /

3.c Residences / / / / 4/

PART E - ADDITIONAL OPERATING INFORMATION

- **1. Estimated pressure at the point and time of the Incident (psig): 111.81
- **2. Normal operating pressure at the point and time of the Incident (psig): 111.81
- **3. Maximum Allowable Operating Pressure (MAOP) at the point and time of the Incident (psig): 121.10
- **4. Describe the pressure on the system relating to the Incident: (select only one)
- ☒ Pressure did not exceed MAOP
 - ☐ Pressure exceeded MAOP, but did not exceed 110% of MAOP
 - ☐ Pressure exceeded 110% of MAOP

5. Was a Supervisory Control and Data Acquisition (SCADA)-based system in place on the pipeline or facility involved in the Incident?

☐ No

☒ Yes b 5.a Was it operating at the time of the Incident?

☒ Yes

☐ No

5.b Was it fully functional at the time of the Incident?

☒ Yes

☐ No

5.c Did SCADA-based information (such as alarm(s), alert(s), event(s), and/or volume or pack calculations) assist with the detection of the Incident?

☐ Yes

☒ No

5.d Did SCADA-based information (such as alarm(s), alert(s), event(s), and/or volume calculations) assist with the confirmation of the Incident?

☐ Yes

☒ No

6. How was the Incident initially identified for the Operator? (select only one)

☐ SCADA-based information (such as alarm(s), alert(s), event(s), and/or volume or pack calculations)

☐ Static Shut-in Test or Other Pressure or Leak Test

☐ Controller

Local Operating Personnel, including contractors

☐ Air Patrol

☐ Ground Patrol by Operator or its contractor

☐ Notification from Public

☒ Notification from Emergency Responder

☐ Notification from Third Party that caused the Incident ☐ Other _____

6.a If "Controller", "Local Operating Personnel, including contractors", "Air Patrol", or "Ground Patrol by Operator or its contractor" is selected in Question 6, specify the following: (select only one)

☒ Operator employee

☐ Contractor working for the Operator

7. Was an investigation initiated into whether or not the controller(s) or control room issues were the cause of or a contributing factor to the Incident? (select only one)

☐ Yes, but the investigation of the control room and/or controller actions has not yet been completed by the operator (Supplemental Report required)

☐ No, the facility was not monitored by a controller(s) at the time of the Incident

☒ No, the operator did not find that an investigation of the controller(s) actions or control room issues was necessary due to: (provide an explanation for why the operator did not investigate) Not applicable since this was leak caused by crack on single main

☐ Yes, Specify investigation result(s): (select all that apply)

☐ Investigation reviewed work schedule rotations, continuous hours of service (while working for the Operator) and other factors associated with fatigue

☐ Investigation did NOT review work schedule rotations, continuous hours of service (while working for the Operator) and other factors associated with fatigue (provide an explanation for why not) _____

☐ Investigation identified no control room issues

☐ Investigation identified no controller issues

☐ Investigation identified incorrect controller action or controller error

☐ Investigation identified that fatigue may have affected the controller(s) involved or impacted the involved controller(s) response

☐ Investigation identified incorrect procedures

☐ Investigation identified incorrect control room equipment operation

☐ Investigation identified maintenance activities that affected control room operations, procedures, and/or controller response

☐ Investigation identified areas other than those above Describe: _____

PART F - DRUG & ALCOHOL TESTING INFORMATION

****1. As a result of this Incident, were any Operator employees tested under the post-accident drug and alcohol testing requirements of DOT's Drug & Alcohol Testing regulations?**

☐ X No

☐ Yes b 1.a Specify how many were tested: 110

1.b Specify how many failed: 10

****2. As a result of this Incident, were any Operator contractor employees tested under the post-accident drug and alcohol testing requirements of DOT's Drug & Alcohol Testing regulations?**

☐ X No

☐ Yes b 2.a Specify how many were tested: 111

2.b Specify how many failed: 11

PART G - APPARENT CAUSE		Select only one box from PART G in the shaded column on the left representing the APPARENT Cause of the Incident, and answer the questions on the right. Describe secondary, contributing, or root causes of the Incident in the narrative (PART H).
G1 - Corrosion Failure - **only one sub-cause can be picked from shaded-left-hand column		
External Corrosion	**1. Results of visual examination: <input type="checkbox"/> Localized Pitting <input type="checkbox"/> General Corrosion <input type="checkbox"/> Other	
	2. Type of corrosion: (select all that apply) <input type="checkbox"/> Galvanic <input type="checkbox"/> Atmospheric <input type="checkbox"/> Stray Current <input type="checkbox"/> Microbiological <input type="checkbox"/> Selective Seam <input type="checkbox"/> Other	
	3. The type(s) of corrosion selected in Question 2 is based on the following: (select all that apply) <input type="checkbox"/> Field examination <input type="checkbox"/> Determined by metallurgical analysis <input type="checkbox"/> Other	
	**4. Was the failed item buried under the ground? <input type="checkbox"/> Yes 4.a Was failed item considered to be under cathodic protection at the time of the incident? <input type="checkbox"/> Yes Year protection started: / / / / / <input type="checkbox"/> No	
	4.b Was shielding, tenting, or disbonding of coating evident at the point of the incident? <input type="checkbox"/> Yes <input type="checkbox"/> No	
	4.c Has one or more Cathodic Protection Survey been conducted at the point of the incident? <input type="checkbox"/> Yes, CP Annual Survey, Most recent year conducted: / / / / / <input type="checkbox"/> Yes, Close Interval Survey, Most recent year conducted: / / / / / <input type="checkbox"/> Yes, Other CP Survey, Most recent year conducted: / / / / / <input type="checkbox"/> No	
	<input type="checkbox"/> No 4.d Was the failed item externally coated or painted? <input type="checkbox"/> Yes <input type="checkbox"/> No	
	5. Was there observable damage to the coating or paint in the vicinity of the corrosion? <input type="checkbox"/> Yes <input type="checkbox"/> No	
	6. Pipeline coating type, If steel pipe is involved: (select only one) <input type="checkbox"/> Fusion Bonded Epoxy <input type="checkbox"/> Coal Tar <input type="checkbox"/> Asphalt <input type="checkbox"/> Polyolefin <input type="checkbox"/> Extruded Polyethylene <input type="checkbox"/> Field Applied Epoxy <input type="checkbox"/> Cold Applied Tape <input type="checkbox"/> Paint <input type="checkbox"/> Composite <input type="checkbox"/> None <input type="checkbox"/> Other	
	<input type="checkbox"/> Unknown	

<input type="checkbox"/> Internal Corrosion	<p>**7. Results of visual examination:</p> <p> <input type="checkbox"/> Localized Pitting <input type="checkbox"/> General Corrosion <input type="checkbox"/> Not cut open <input type="checkbox"/> Other </p> <p>8. Cause of corrosion: (select all that apply)</p> <p> <input type="checkbox"/> Corrosive Commodity <input type="checkbox"/> Water drop-out/Acid <input type="checkbox"/> Microbiological <input type="checkbox"/> Erosion <input type="checkbox"/> Other </p> <p>9. The cause(s) of corrosion selected in Question 8 is based on the following; (select all that apply)</p> <p> <input type="checkbox"/> Field examination <input type="checkbox"/> Determined by metallurgical analysis <input type="checkbox"/> Other </p> <p>10. Location of corrosion: (select all that apply)</p> <p> <input type="checkbox"/> Low point in pipe <input type="checkbox"/> Elbow <input type="checkbox"/> Drop-out <input type="checkbox"/> Other </p> <p>**11. Was the gas/fluid treated with corrosion inhibitors or biocides? <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>12. Were any liquids found in the distribution system where the Incident occurred?</p> <p> <input type="checkbox"/> Yes <input type="checkbox"/> No </p>
<p>Complete the following if any Corrosion Failure Question 2) is Main, Service, or Service Riser.</p> <p>**13. Date of the most recent Leak Survey conducted:</p> <p style="text-align: center;">C, / / / / / / / /</p> <p style="text-align: center;">Month Day Year</p> <p>**14. Has one or more pressure test been conducted</p> <p style="text-align: center;">since original construction at the point of the Incident?</p> <p style="text-align: center;">/ / / / Test pressure (psig): / / / / / /</p> <p style="text-align: center;"><input type="checkbox"/> No</p>	
<p>G2 – Natural Force Damage – **only one sub-cause can be picked from shaded left-handed column</p>	
<input checked="" type="checkbox"/> Earth Movement, NOT due to Heavy Rains/Floods	<p>**1. Specify: <input type="checkbox"/> Earthquake <input type="checkbox"/> Subsidence <input type="checkbox"/> Landslide <input type="checkbox"/> Other </p>
<input type="checkbox"/> Heavy Rains/Floods	<p>2. Specify: <input type="checkbox"/> Washouts/Scouring <input type="checkbox"/> Flotation <input type="checkbox"/> Mudslide <input type="checkbox"/> Other</p>
<input type="checkbox"/> Lightning	<p>3. Specify: <input type="checkbox"/> Direct hit <input type="checkbox"/> Secondary impact such as resulting nearby fires</p>
<input checked="" type="checkbox"/> Temperature	<p>**4. Specify: <input type="checkbox"/> Thermal Stress <input checked="" type="checkbox"/> Frost Heave <input type="checkbox"/> Frozen Components <input type="checkbox"/> Other </p>
<input type="checkbox"/> High Winds	
<input type="checkbox"/> Other Natural Force Damage	<p>**5. Describe:</p>
<p>Complete the following if any Natural Force Damage sub-cause is selected.</p> <p>**6. Were the natural forces causing the Incident generated in conjunction with an extreme weather event? <input type="checkbox"/> Yes <input type="checkbox"/> No</p> <p>6.a. If Yes, specify: (select all that apply)</p> <p> <input type="checkbox"/> Hurricane <input type="checkbox"/> Tropical Storm <input type="checkbox"/> Tornado <input type="checkbox"/> Other </p>	

G3 - Excavation Damage - "only one sub-cause can be picked from shaded left-hand column"

<input type="checkbox"/> Excavation Damage by Operator (First Party)	
<input type="checkbox"/> Excavation Damage by Operator's Contractor (Second Party)	
<input type="checkbox"/> Excavation Damage by Third Party	
<input type="checkbox"/> Previous Damage due to Excavation Activity	<p>Complete the following ONLY IF the "Part of system involved in Incident" (from PART C, Question 2) is Main, Service, or Service Riser.</p> <p>"1. Date of the most recent Leak Survey conducted: / / / / / / / / / / Month Day Year</p> <p>"2. Has one or more pressure test been conducted since original construction at the point of the Incident? <input type="checkbox"/> Yes <input type="checkbox"/> No Most recent year tested: / / / / / /</p> <p>Test pressure (psig): / / / / / / / / <input type="checkbox"/> No</p>

Complete the following If Excavation Damage by Third Party is selected.

"3. Did the operator get prior notification of the excavation activity? ☐ Yes ☐ No
3.a If Yes, Notification received from: (select all that apply) ☐ One-Call System ☐ Excavator ☐ Contractor ☐ Landowner

Complete the following mandatory CGA-DIRT Program questions If any Excavation Damage sub-cause is selected.

"4. Do you want PHMSA to upload the following information to CGA-DIRT (www.cga-dirt.com)? ☐ Yes ☐ No

"5. Right-of-Way where event occurred: (select all that apply)

- ☐ Public ☐ Specify: ☐ City Street ☐ State Highway ☐ County Road ☐ Interstate Highway ☐ Other
- ☐ Private ☐ Specify: ☐ Private Landowner ☐ Private Business ☐ Private Easement
- ☐ Pipeline Property/Easement
- ☐ Power/Transmission Line
- ☐ Railroad
- ☐ Dedicated Public Utility Easement
- ☐ Federal Land
- ☐ Data not collected
- ☐ Unknown/Other

"6. Type of excavator: (select only one)

- ☐ Contractor ☐ County ☐ Developer ☐ Farmer ☐ Municipality ☐ Occupant
- ☐ Railroad ☐ State ☐ Utility ☐ Data not collected ☐ Unknown/Other

"7. Type of excavation equipment: (select only one)

- ☐ Auger ☐ Backhoe/Trackhoe ☐ Boring ☐ Drilling ☐ Directional Drilling
- ☐ Explosives ☐ Farm Equipment ☐ Grader/Scraper ☐ Hand Tools ☐ Milling Equipment
- ☐ Probing Device ☐ Trencher ☐ Vacuum Equipment ☐ Data not collected ☐ Unknown/Other

"8. Type of work performed: (select only one)

- ☐ Agriculture ☐ Cable TV ☐ Curb/Sidewalk ☐ Building Construction ☐ Building Demolition
- ☐ Drainage ☐ Driveway ☐ Electric ☐ Engineering/Surveying ☐ Fencing
- ☐ Grading ☐ Irrigation ☐ Landscaping ☐ Liquid Pipeline ☐ Milling
- ☐ Natural Gas ☐ Pole ☐ Public Transit Authority ☐ Railroad Maintenance ☐ Road Work
- ☐ Sewer (Sanitary/Storm) ☐ Site Development ☐ Steam ☐ Storm Drain/Culvert ☐ Street Light
- ☐ Telecommunications ☐ Traffic Signal ☐ Traffic Sign ☐ Water ☐ Waterway Improvement
- ☐ Data not collected ☐ Unknown/Other

This CGA-DIRT section continued on next page with Question 9.)

9. Was the One-Call Center notified? • Yes • No

g.a If Yes, specify ticket number: / / / / / / / / / / / / / / /

g.b If this is a State where more than a single One-Call Center exists, list the name of the One-Call Center notified:

10. Type of Locator: • Utility Owner • Contractor Locator • Data not collected • Unknown/Other

11. Were facility locate marks visible in the area of excavation? ☐ No ☐ Yes ☐ Data not collected ☐ Unknown/Other

12. Were facilities marked correctly? ☐ No ☐ Yes ☐ Data not collected ☐ Unknown/Other

13. Did the damage cause an interruption in service? ☐ No ☐ Yes ☐ Data not collected ☐ Unknown/Other

13.a If Yes, specify duration of the interruption: / / / / hours

14. Description of the CGA-DIRT Root Cause (select only the one predominant first level CGA-DIRT Root Cause and then, where available as a choice, the one predominant second level CGA-DIRT Root Cause as well):

☐ One-Call Notification Practices Not Sufficient: (select only one)

- No notification made to the One-Call Center
- Notification to One-Call Center made, but not sufficient
- Wrong information provided

☐ Locating Practices Not Sufficient: (select only one)

- Facility could not be found/located
- Facility marking or location not sufficient
- Facility was not located or marked
- Incorrect facility records/maps

☐ Excavation Practices Not Sufficient: (select only one)

- Excavation practices not sufficient (other)
- Failure to maintain clearance
- Failure to maintain the marks
- Failure to support exposed facilities
- Failure to use hand tools where required
- Failure to verify location by test-hole (pot-holing)
- Improper backfilling

☐ **One-Call Notification Center Error**

☐ Abandoned Facility

☐ Deteriorated Facility

☐ Previous Damage

☐ Data Not Collected

☐ Other / None of the Above (explain)

G4 – Other Outside Force Damage – **only one sub-cause can be selected from the shaded left-hand column

[illegible]

G5 – Pipe, Weld, or Joint Failure – **only one sub-cause can be selected from the shaded left-hand column

<input type="checkbox"/> Body of Pipe	1. Specify: • Dent • Gouge • Bend • Arc Burn • Crack • Other
<input type="checkbox"/> Butt Weld	2. Specify: • Pipe • Fabrication • Other
<input type="checkbox"/> Fillet Weld	3. Specify: • Branch • Hot Tap • Fitting • Repair Sleeve • Other
<input type="checkbox"/> Pipe Seam	4. Specify: • LF ERW • DSAW • Flash Weld • HF ERW • SAW • Spiral • Other
<input type="checkbox"/> Threaded Metallic Pipe	
<input type="checkbox"/> Mechanical Fitting	<p>5. Specify the mechanical fitting involved: • Stub type fitting • Nut follower type fitting • Bolted type fitting • Other</p> <p>6. Specify the type of mechanical fitting: • Service Tee • Coupling • Service Head Adapter • Basement Adapter • Riser • Elbow • Other</p> <p>7. Manufacturer:</p> <p>8. Year manufactured: / / / / /</p> <p>9. Year installed: / / / / /</p> <p>10. Other attributes:</p> <p>11. Specify the two materials being joined: 11.a First material being joined: <input type="checkbox"/> Steel • Cast/Wrought Iron <input type="checkbox"/> Ductile Iron • Copper • Plastic <input type="checkbox"/> Unknown <input type="checkbox"/> Other .. Specify:</p> <p>11.b If Plastic Specify: • Polyvinyl Chloride (PVC) • Polyethylene (PE) • Cross-linked Polyethylene (PEX) • Polybutylene (PB) • Polypropylene (PP) • Acrylonitrile Butadiene Styrene (ABS) • Polyamide (PA) • Cellulose Acetate Butyrate (CAB) • Other .. Specify:</p> <p>11.c Second material being joined: <input type="checkbox"/> Steel • Cast/Wrought Iron <input type="checkbox"/> Ductile Iron • Copper • Plastic <input type="checkbox"/> Unknown <input type="checkbox"/> Other .. Specify:</p> <p>11.d If Plastic Specify: • Polyvinyl Chloride (PVC) • Polyethylene (PE) • Cross-linked Polyethylene (PEX) • Polybutylene (PB) • Polypropylene (PP) • Acrylonitrile Butadiene Styrene (ABS) • Polyamide (PA) • Cellulose Acetate Butyrate (CAB) • Other .. Specify:</p> <p>12. If used on plastic pipe, did the fitting – as designed by the manufacturer – include restraint? • Yes • No • Unknown 12.a If Yes, specify: • Cat. I • Cat. II • Cat. III • DOT 192.283</p>

<input type="checkbox"/> Compression Fitting	13. Fitting type:
	14. Manufacturer:
	15. Year manufactured: / / / /
	16. Year installed: / / / /
	17. Other attributes
	18. Specify the two materials being joined:
	18.a First material being joined:
	<input type="checkbox"/> Steel <input type="checkbox"/> Cast/Wrought Iron <input type="checkbox"/> Ductile Iron <input type="checkbox"/> Copper <input type="checkbox"/> Plastic <input type="checkbox"/> Unknown <input type="checkbox"/> Other .. Specify:
	18.b If Plastic <input type="checkbox"/> Specify: <input type="checkbox"/> Polyvinyl Chloride (PVC) <input type="checkbox"/> Polyethylene (PE) <input type="checkbox"/> Cross-linked Polyethylene (PEX) <input type="checkbox"/> Polybutylene (PB) <input type="checkbox"/> Polypropylene (PP) <input type="checkbox"/> Acrylonitrile Butadiene Styrene (ABS) <input type="checkbox"/> Polyamide (PA) <input type="checkbox"/> Cellulose Acetate Butyrate (CAB) <input type="checkbox"/> Other .. Specify:
	18.c Second material being joined:
<input type="checkbox"/> Steel <input type="checkbox"/> Cast/Wrought Iron <input type="checkbox"/> Ductile Iron <input type="checkbox"/> Copper <input type="checkbox"/> Plastic <input type="checkbox"/> Unknown <input type="checkbox"/> Other .. Specify:	
18.d If Plastic <input type="checkbox"/> Specify: <input type="checkbox"/> Polyvinyl Chloride (PVC) <input type="checkbox"/> Polyethylene (PE) <input type="checkbox"/> Cross-linked Polyethylene (PEX) <input type="checkbox"/> Polybutylene (PB) <input type="checkbox"/> Polypropylene (PP) <input type="checkbox"/> Acrylonitrile Butadiene Styrene (ABS) <input type="checkbox"/> Polyamide (PA) <input type="checkbox"/> Cellulose Acetate Butyrate (CAB) <input type="checkbox"/> Other .. Specify:	
<input type="checkbox"/> Fusion Joint	19. Specify: <input type="checkbox"/> Butt, Heat Fusion <input type="checkbox"/> Butt, Electrofusion <input type="checkbox"/> Saddle, Heat Fusion <input type="checkbox"/> Saddle, Electrofusion <input type="checkbox"/> Socket, Heat Fusion <input type="checkbox"/> Socket, Electrofusion <input type="checkbox"/> Other
	20. Year installed: / / / /
	21. Other attributes:
	22. Specify the two materials being joined:
	22.a First material being joined:
<input type="checkbox"/> Polyvinyl Chloride (PVC) <input type="checkbox"/> Polyethylene (PE) <input type="checkbox"/> Cross-linked Polyethylene (PEX) <input type="checkbox"/> Polybutylene (PB) <input type="checkbox"/> Polypropylene (PP) <input type="checkbox"/> Acrylonitrile Butadiene Styrene (ABS) <input type="checkbox"/> Polyamide (PA) <input type="checkbox"/> Cellulose Acetate Butyrate (CAB) <input type="checkbox"/> Other .. Specify:	
22.b Second material being joined:	
<input type="checkbox"/> Polyvinyl Chloride (PVC) <input type="checkbox"/> Polyethylene (PE) <input type="checkbox"/> Cross-linked Polyethylene (PEX) <input type="checkbox"/> Polybutylene (PB) <input type="checkbox"/> Polypropylene (PP) <input type="checkbox"/> Acrylonitrile Butadiene Styrene (ABS) <input type="checkbox"/> Polyamide (PA) <input type="checkbox"/> Cellulose Acetate Butyrate (CAB) <input type="checkbox"/> Other .. Specify:	
<input type="checkbox"/> Other Pipe, Weld, or Joint Failure	23. Describe:

24. Additional Factors: (select all that apply)

<input type="checkbox"/> Dent	<input type="checkbox"/> Gouge	<input type="checkbox"/> Pipe Bend	<input type="checkbox"/> Arc Burn	<input type="checkbox"/> Crack	<input type="checkbox"/> Lack of Fusion
<input type="checkbox"/> Lamination	<input type="checkbox"/> Buckle	<input type="checkbox"/> Wrinkle	<input type="checkbox"/> Misalignment	<input type="checkbox"/> Burnt Steel	
<input type="checkbox"/> Other					

- Construction defect, specify: • Poor workmanship • Procedure not followed • Poor construction/installation procedures
- Material defect, specify: • Long standing • Other
- Design defect
- Previous damage

☐ Yes. Most recent year tested: / / / / / Test pressure (psig): / / / / /
☐ No

- **Malfunction of Control/Relief Equipment**

- Control Valve
- Communications
- Relief Valve
- Pressure Regulator
- Other
- Instrumentation
- Block Valve
- Power Failure
- SCADA
- Check Valve
- Stopple/Control Fitting

2. Specify: • Pipe Nipple • Valve Threads • Threaded Pipe Collar
• Threaded Fitting
• Other

3. Specify: ☐ O-Ring ☐ Gasket ☐ Other Seal or Packing
 ☐ Other

5.c Year manufactured: / / / / /

****5. Describe:**

G7 – Incorrect Operation – **only one sub-cause can be selected from the shaded left-hand column

<input type="checkbox"/> Damage by Operator or Operator's Contractor NOT Related to Excavation and NOT due to Motorized Vehicle/Equipment Damage	
<input type="checkbox"/> Valve Left or Placed in Wrong Position, but NOT Resulting in an Overpressure	
<input type="checkbox"/> Pipeline or Equipment Overpressured	
<input type="checkbox"/> Equipment Not Installed Properly	
<input type="checkbox"/> Wrong Equipment Specified or Installed	
Other Incorrect Operation	**1. Describe: .

Complete the following if any Incorrect Operation sub-cause is selected.

2. Was this Incident related to: (select all that apply)

- Inadequate procedure
- No procedure established
- Failure to follow procedure
- Other:

**3. What category type was the activity that caused the Incident:

- Construction
- Commissioning
- Decommissioning
- Right-of-Way activities
- Routine maintenance
- Other maintenance
- Normal operating conditions
- Non-routine operating conditions (abnormal operations or emergencies)

4. Was the task(s) that led to the Incident identified as a covered task in your Operator Qualification Program? X Yes ◦ No

4.a If Yes, were the individuals performing the task(s) qualified for the task(s)?

- Yes, they were qualified for the task(s)
- No, but they were performing the task(s) under the direction and observation of a qualified individual
- No, they were not qualified for the task(s) nor were they performing the task(s) under the direction and observation of a qualified individual

G8 – Other Incident Cause – only one sub-cause can be selected from the shaded left-hand column

<input type="checkbox"/> Miscellaneous	**1. Describe:
<input type="checkbox"/> Unknown	**2. Specify: ◦ Investigation complete, cause of Incident unknown ◦ Still under investigation, cause of Incident to be determined (Supplemental Report required)

PART H – NARRATIVE DESCRIPTION OF THE INCIDENT

(Attach additional sheets as necessary)

****PART I – PREPARER AND AUTHORIZED SIGNATURE**

Christopher S. Arnsen

Preparer's Name (type or print)

Senior Counsel

Preparer's Title (type or print)

christopher.arnsen@us.ngrid.com

Preparer's E-mail Address

781-907-1854

Preparer's Telephone Number

681/907-5701

Preparer's Facsimile Number

Authorized Signature

Christopher S. Arnsen

Date

Authorized Signature's Name (type or print)

Authorized Signature's Title (type or

781-907-1854

Authorized Signature Telephone Number

Authorized Signature's E-mail Address

EXHIBIT 2

Reading Fire Department Report

A FDID * <u>17246</u> State * <u>MA</u> Incident Date * <u>01</u> <u>25</u> <u>2010</u> Station <u>HQ</u> Incident Number * <u>10-0000317</u> Exposure * <u>000</u> <input type="checkbox"/> Delete <input type="checkbox"/> Change <input type="checkbox"/> No Activity NFIRS -1 Basic	
B Location* <input checked="" type="checkbox"/> Street address <u>22</u> <u>Manning Street</u> Street Type Suffix <input type="checkbox"/> Intersection Number/Milepost Prefix Street or Highway <input type="checkbox"/> In front of <u>n</u> <u>Reading</u> State <u>MA</u> Zip Code <u>01867</u> <input type="checkbox"/> Rear of Apt./Suite/Room City <input type="checkbox"/> Adjacent to <input type="checkbox"/> Directions Cross street or directions, as applicable	
C Incident Type * <u>111</u> <u>Building fire</u> Incident Type	E1 Date & Times Midnight is 0000 Check boxes if dates are the same as Alarm Date. Alarm always required Month Day Year Hr Min Sec Alarm * <u>01</u> <u>25</u> <u>2010</u> <u>18:01:00</u> ARRIVAL required, unless canceled or did not arrive <input checked="" type="checkbox"/> Arrival * <u>01</u> <u>25</u> <u>2010</u> <u>18:04:00</u> CONTROLLED Optional, Except for wildland fires <input type="checkbox"/> Controlled LAST UNIT CLEARED, required except for wildland fires <input checked="" type="checkbox"/> Last Unit <u>01</u> <u>25</u> <u>2010</u> <u>23:07:00</u> <input checked="" type="checkbox"/> Cleared
D Aid Given or Received* 1 <input checked="" type="checkbox"/> Mutual aid received <u>17284</u> Their FDID Their State 2 <input type="checkbox"/> Automatic aid recvd. 3 <input type="checkbox"/> Mutual aid given 4 <input type="checkbox"/> Automatic aid given 5 <input type="checkbox"/> Other aid given N <input type="checkbox"/> None Their Incident Number	E2 Shift & Alarms Local Option <u>4</u> <u>01</u> <u>HQ</u> Shift or Alarm District Platoon
F Actions Taken* <u>00A</u> <u>Investigate & Provided</u> Primary Action Taken (1) Additional Action Taken (2) Additional Action Taken (3)	G1 Resources * <input type="checkbox"/> Check this box and skip this section if an Apparatus or Personnel form is used. Apparatus Personnel Suppression <u>0005</u> EMS Other <input type="checkbox"/> Check box if resource counts include aid received resources.
G2 Estimated Dollar Losses & Values LOSSES: Required for all fires if known. Optional for non fires. None Property \$ <u>425</u> <u>000</u> Contents \$ <u>025</u> <u>000</u> PRE-INCIDENT VALUE: Optional Property \$ <u>450</u> <u>000</u> Contents \$ <u>100</u> <u>000</u>	
Completed Modules <input checked="" type="checkbox"/> Fire-2 <input checked="" type="checkbox"/> Structure-3 <input checked="" type="checkbox"/> Civil Fire Cas.-4 <input type="checkbox"/> Fire Serv. Cas.-5 <input type="checkbox"/> EMS-6 <input type="checkbox"/> HazMat-7 <input type="checkbox"/> Wildland Fire-8 <input checked="" type="checkbox"/> Apparatus-9 <input type="checkbox"/> Personnel-10 <input type="checkbox"/> Arson-11	
H1* Casualties None Deaths Injuries Fire <u>001</u> Service Civilian H2 Detector Required for Confined Fires. 1 <input type="checkbox"/> Detector alerted occupants 2 <input type="checkbox"/> Detector did not alert them U <input type="checkbox"/> Unknown	H3 Hazardous Materials Release N <input type="checkbox"/> None 1 <input type="checkbox"/> Natural GAS: slow leak, no evacuation or HazMat actions 2 <input type="checkbox"/> Propane GAS: <u>all</u> lb. tank (as in home BBQ grill) 3 <input type="checkbox"/> Gasoline: vehicle fuel tank or portable container 4 <input type="checkbox"/> Kerosene: fuel burning equipment or portable storage 5 <input type="checkbox"/> Diesel fuel/fuel oil: vehicle fuel tank or portable 6 <input type="checkbox"/> Household solvents: home/office spill, cleanup only 7 <input type="checkbox"/> Motor oil: from engine or portable container 8 <input type="checkbox"/> Paint: from paint cans totaling < 55 gallons 0 <input type="checkbox"/> Other: Special HazMat actions required or spill > 55 gal., please complete the HazMat form
I Mixed Use Property NN <input type="checkbox"/> Not Mixed 10 <input type="checkbox"/> Assembly use 20 <input type="checkbox"/> Education use 30 <input type="checkbox"/> Medical use 40 <input type="checkbox"/> Residential use 51 <input type="checkbox"/> Row of stores 53 <input type="checkbox"/> Enclosed mall 58 <input type="checkbox"/> Bus. & Residential 59 <input type="checkbox"/> Office use 60 <input type="checkbox"/> Industrial use 63 <input type="checkbox"/> Military use 65 <input type="checkbox"/> Farm use 00 <input type="checkbox"/> Other mixed use	
J Property Use* Structures 131 <input type="checkbox"/> Church, place of worship 161 <input type="checkbox"/> Restaurant or cafeteria 162 <input type="checkbox"/> Bar/Tavern or nightclub 213 <input type="checkbox"/> Elementary school or kindergarten 215 <input type="checkbox"/> High school or junior high 241 <input type="checkbox"/> College, adult education 311 <input type="checkbox"/> Care facility for the aged 331 <input type="checkbox"/> Hospital	Outside 124 <input type="checkbox"/> Playground or park 655 <input type="checkbox"/> Crops or orchard 669 <input type="checkbox"/> Forest (timberland) 807 <input type="checkbox"/> Outdoor storage area 919 <input type="checkbox"/> Dump or sanitary landfill 931 <input type="checkbox"/> Open land or field 341 <input type="checkbox"/> Clinic, clinic type infirmary 342 <input type="checkbox"/> Doctor/dentist office 361 <input type="checkbox"/> Prison or jail, not juvenile 419 <input checked="" type="checkbox"/> 1-or 2-family dwelling 429 <input type="checkbox"/> Multi-family dwelling 439 <input type="checkbox"/> Rooming/boarded house 449 <input type="checkbox"/> Commercial hotel or motel 459 <input type="checkbox"/> Residential, board and care 464 <input type="checkbox"/> Dormitory/barracks 519 <input type="checkbox"/> Food and beverage sales 936 <input type="checkbox"/> Vacant lot 938 <input type="checkbox"/> Graded/care for plot of land 946 <input type="checkbox"/> Lake, river, stream 951 <input type="checkbox"/> Railroad right of way 960 <input type="checkbox"/> Other street 961 <input type="checkbox"/> Highway/divided highway 962 <input type="checkbox"/> Residential street/driveway 539 <input type="checkbox"/> Household goods, sales, repairs 579 <input type="checkbox"/> Motor vehicle/boat sales/repair 571 <input type="checkbox"/> Gas or service station 599 <input type="checkbox"/> Business office 615 <input type="checkbox"/> Electric generating plant 629 <input type="checkbox"/> Laboratory/science lab 700 <input type="checkbox"/> Manufacturing plant 819 <input type="checkbox"/> Livestock/poultry storage (barn) 882 <input type="checkbox"/> Non-residential parking garage 891 <input type="checkbox"/> Warehouse 981 <input type="checkbox"/> Construction site 984 <input type="checkbox"/> Industrial plant yard
Lookup and enter a Property Use code only if you have NOT checked a Property Use box: Property Use <u>419</u> <u>1 or 2 family dwelling</u> NFIRS-1 Revision 03/11/99	

K1. Person/Entity Involved

Local Option

Business name (if applicable)

Area Code

Phone Number

☐ Check this box if same address as incident location. Then skip the three duplicate address lines.

Mr., Ms., Mrs. First Name

MI

Last Name

Suffix

Number

Prefix

Street or Highway

Street Type

Suffix

Post Office Box

Apt./Suite/Room

City

State

Zip Code

☐ More people involved? Check this box and attach Supplemental Forms (NFIRS-1S) as necessary

K2 Owner

☐ Same as person involved? Then check this box and skip the rest of this section.

Local Option

Business name (if applicable)

Area Code

Phone Number

☐ Check this box if same address as incident location. Then skip the three duplicate address lines.

Mr., Ms., Mrs. First Name

MI

Last Name

Suffix

Number

Prefix

Street or Highway

Street Type

Suffix

Post Office Box

Apt./Suite/Room

City

State

Zip Code

L Remarks

Local Option

Call for reported house explosion at 22 Manning Street. Upon arrival strong odor of natural gas, light smoke from first floor, "B" wall damage visible from exterior. Investigation found contents fire first floor and active fire in basement. One 1 3/4 line taken to basement to knock down fire. Ventilation of basement windows to allow products of combustion to escape. Hydrant line laid but not charged and Ladder 1 -stick to roof.

Fans used for ventilation of first and second floor. RMLD and Keyspan called to scene. Notification made to Marshall's Office for member of Investigation Team. Trooper Peter Camonte and Sergeant Peter Cummings responded. Detective Mike Saunders from RP responded. Investigation by Keyspan of houses in area had readings ranging from 2-27% gas. Readings taken in basement after fire extinguished, by crack in basement floor and plumbing drain, were 24 - 27% gas.

Investigation of area of origin found that an explosion had occurred of natural gas ignited by gas furnace. Subsequent fireball and blast pressure traveled up basement staircase through first floor and up main staircase pushing out "B" & "C" walls of house. Interior walls damaged on first floor and ceilings on second floor due to blast. Moderate fire damage in basement, kitchen first floor and entrance hall.

Mr. Gary Bennett, National Grid, was the field supervisor overseeing crews from Keyspan. Excavation found crack in 6" gas main in front of dwelling. State Police from Marshall's Office contacted Department of Public Utilities and Mr. Jorge Santi arrived on scene to oversee crews from Keyspan and National Grid. Crews from Keyspan stayed on scene throughout the night with detail from RPD. Houses in the neighborhood would be checked hourly for readings by Keyspan.

L Authorization

0238

Officer in charge ID

Jackson, Paul

Signature

LT

Position or rank

Assignment

01

Month

26

Day

2010

Year

Check Box if same as Officer in charge.

Member making report ID

Unknown Staff Member

Signature

Position or rank

Assignment

Month

Day

Year

17246	MA	MM DD YYYY	HQ	10-0000317	000	Complete Narrative
FDID *	State *	Incident Date *	Station	Incident Number *	Exposure *	

Narrative:

Call for reported house explosion at 22 Manning Street. Upon arrival strong odor of natural gas, light smoke from first floor, "B" wall damage visible from exterior. Investigation found contents fire first floor and active fire in basement. One 1 3/4 line taken to basement to knock down fire. Ventilation of basement windows to allow products of combustion to escape. Hydrant line laid but not charged and Ladder 1 -stick to roof.

Fans used for ventilation of first and second floor. RMLD and Keyspan called to scene. Notification made to Marshall's Office for member of Investigation Team. Trooper Peter Bramonte and Sergeant Peter Cummings responded. Detective Mike Saunders from RP responded. Investigation by Keyspan of houses in area had readings ranging from 2-27% gas. Readings taken in basement after fire extinguished, by crack in basement floor and plumbing drain, were 24 - 27% gas.

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House occupies at time of incident by: [REDACTED]

[REDACTED] was admitted to Winchester Hospital for observation of chest pain, report attached.

Jan 20 10 56 AM		MM DD YYYY 01 25 2010		Station HQ	Incident Number * 10-0000317	Exposure * 000	<input type="checkbox"/> Delete <input checked="" type="checkbox"/> Change <input type="checkbox"/> No Activity	NFIRS - 2 Fire
FDID * 17246		State * MA						

B Property Details B1 0002 <input type="checkbox"/> Not Residential Estimated Number of residential living units in building of origin whether or not all units became involved B2 001 <input type="checkbox"/> Buildings not involved Number of buildings involved B3 <input type="checkbox"/> None Acres burned (outside fires) <input type="checkbox"/> Less than one acre	C On-Site Materials or Products <input type="checkbox"/> None Complete if there were any significant amounts of commercial, industrial, energy or agricultural products or materials on the property, whether or not they became involved. Enter up to three codes. Check one or more boxes for each code entered. <div style="display: flex; justify-content: space-between;"> <div style="width: 60%;"> On-site material (1) On-site material (2) On-site material (3) </div> <div style="width: 35%;"> 1 <input type="checkbox"/> Bulk storage or warehousing 2 <input type="checkbox"/> Processing or manufacturing 3 <input type="checkbox"/> Packaged goods for sale 4 <input type="checkbox"/> Repair or service 1 <input type="checkbox"/> Bulk storage or warehousing 2 <input type="checkbox"/> Processing or manufacturing 3 <input type="checkbox"/> Packaged goods for sale 4 <input type="checkbox"/> Repair or service 1 <input type="checkbox"/> Bulk storage or warehousing 2 <input type="checkbox"/> Processing or manufacturing 3 <input type="checkbox"/> Packaged goods for sale 4 <input type="checkbox"/> Repair or service </div> </div>
--	--

D Ignition D1 62 Heating room or area, Area of fire origin * D2 10 Heat from powered Heat source * D3 64 Flammable liquid/gas in item first ignited * <input type="checkbox"/> Check Box if fire spread was confined to object of origin D4 11 Natural gas Type of material first ignited required only if item first ignited code is 00 or <70	E1 Cause of Ignition <input type="checkbox"/> Check box if this is an exposure report. Skip to section G 1 <input type="checkbox"/> Intentional 2 <input checked="" type="checkbox"/> Unintentional 3 <input type="checkbox"/> Failure of equipment or heat source 4 <input type="checkbox"/> Act of nature 5 <input type="checkbox"/> Cause under investigation U <input type="checkbox"/> Cause undetermined after investigation	E3 Human Factors Contributing To Ignition Check all applicable boxes 1 <input type="checkbox"/> Asleep <input checked="" type="checkbox"/> None 2 <input type="checkbox"/> Possibly impaired by alcohol or drugs 3 <input type="checkbox"/> Unattended person 4 <input type="checkbox"/> Possibly mental disabled 5 <input type="checkbox"/> Physically Disabled 6 <input type="checkbox"/> Multiple persons involved 7 <input type="checkbox"/> Age was a factor Estimated age of person involved _____ 1 <input type="checkbox"/> Male 2 <input type="checkbox"/> Female
F1 Equipment Involved In Ignition <input type="checkbox"/> None If Equipment was not involved, skip to Section G 132 Furnace, central Equipment involved Brand _____ Model _____ Serial # _____ Year _____	F2 Equipment Power 21 Natural gas or Equipment power source F3 Equipment Portability 1 <input type="checkbox"/> Portable 2 <input checked="" type="checkbox"/> Stationary Portable equipment normally can be moved by one person, is designed to be used in multiple locations, and requires no tools to install.	G Fire Suppression Factors Enter up to three codes. <input type="checkbox"/> None Fire suppression factor (1) _____ Fire suppression factor (2) _____ Fire suppression factor (3) _____

H1 Mobile Property Involved <input checked="" type="checkbox"/> None 1 <input type="checkbox"/> Not involved in ignition, but burned 2 <input type="checkbox"/> Involved in ignition, but did not burn 3 <input type="checkbox"/> Involved in ignition and burned	H2 Mobile Property Type & Make NN None Mobile property type Mobile property make _____ Mobile property model _____ Year _____ License Plate Number _____ State _____ VIN Number _____	I Local Use <input type="checkbox"/> Pre-Fire Plan Available Some of the information presented in this report may be based upon reports from other agencies <input type="checkbox"/> Arson report attached <input type="checkbox"/> Police report attached <input type="checkbox"/> Coroner report attached <input type="checkbox"/> Other reports attached
--	---	--

I1 Structure Type * If fire was in enclosed building or a portable/mobile structure complete the rest of this form 1 <input checked="" type="checkbox"/> Enclosed Building 2 <input type="checkbox"/> Portable/mobile structure 3 <input type="checkbox"/> Open structure 4 <input type="checkbox"/> Air supported structure 5 <input type="checkbox"/> Tent 6 <input type="checkbox"/> Open platform (e.g. piers) 7 <input type="checkbox"/> Underground structure (work areas) 8 <input type="checkbox"/> Connective structure (e.g. fences) 0 <input type="checkbox"/> Other type of structure		I2 Building Status * 1 <input type="checkbox"/> Under construction 2 <input checked="" type="checkbox"/> Occupied & operating 3 <input type="checkbox"/> Idle, not routinely used 4 <input type="checkbox"/> Under major renovation 5 <input type="checkbox"/> Vacant and secured 6 <input type="checkbox"/> Vacant and unsecured 7 <input type="checkbox"/> Being demolished 0 <input type="checkbox"/> Other U <input type="checkbox"/> Undetermined		I3 Building * Height Count the ROOF as part of the highest story <div style="border: 1px solid black; padding: 2px; display: inline-block;">002</div> <small>Total number of stories at or above grade</small> <div style="border: 1px solid black; padding: 2px; display: inline-block;">001</div> <small>Total number of stories below grade</small>		I4 Main Floor Size* <div style="border: 1px solid black; padding: 2px; display: inline-block;">001</div> , <div style="border: 1px solid black; padding: 2px; display: inline-block;">400</div> <small>Total square feet</small> OR <div style="border: 1px solid black; padding: 2px; display: inline-block;">050</div> BY <div style="border: 1px solid black; padding: 2px; display: inline-block;">028</div> <small>Length in feet Width in feet</small>		NFIRS-3 Structure Fire	
J1 Fire Origin * <div style="border: 1px solid black; padding: 2px; display: inline-block;">001</div> <input checked="" type="checkbox"/> Below Grade <small>Story of fire origin</small>		J3 Number of Stories Damaged By Flame Count the ROOF as part of the highest story <div style="border: 1px solid black; padding: 2px; display: inline-block;">001</div> Number of stories w/ minor damage (1 to 24% flame damage) <div style="border: 1px solid black; padding: 2px; display: inline-block;">002</div> Number of stories w/ significant damage (25 to 45% flame damage) Number of stories w/ heavy damage (56 to 74% flame damage) Number of stories w/ extreme damage (75 to 100% flame damage)		K Material Contributing Most To Flame Spread <input type="checkbox"/> Check if no flame spread OR same as material first ignited OR unable to determine Skip To Section L K1 <div style="border: 1px solid black; padding: 2px; display: inline-block;">65</div> <u>Flammable liquid/gas -</u> <small>Item contributing most to flame spread</small> K2 <div style="border: 1px solid black; padding: 2px; display: inline-block;">11</div> <u>Natural gas</u> <small>Type of material contributing most of flame spread Required only if item contributing code is 00 or 70</small>					
J2 Fire Spread * 1 <input type="checkbox"/> Confined to object of origin 2 <input type="checkbox"/> Confined to room of origin 3 <input type="checkbox"/> Confined to floor of origin 4 <input checked="" type="checkbox"/> Confined to building of origin 5 <input type="checkbox"/> Beyond building of origin		L1 Presence of Detectors * (In area of the fire) N <input type="checkbox"/> None Present Skip to section M 1 <input checked="" type="checkbox"/> Present U <input type="checkbox"/> Undetermined		L3 Detector Power Supply 1 <input type="checkbox"/> Battery only 2 <input checked="" type="checkbox"/> Hardwire only 3 <input type="checkbox"/> Plug in 4 <input type="checkbox"/> Hardwire with battery 5 <input type="checkbox"/> Plug in with battery 6 <input type="checkbox"/> Mechanical 7 <input type="checkbox"/> Multiple detectors & power supplies 0 <input type="checkbox"/> Other U <input type="checkbox"/> Undetermined		L5 Detector Effectiveness Required if detector operated 1 <input type="checkbox"/> Alerted Occupants, occupants responded 2 <input type="checkbox"/> Occupants failed to respond 3 <input type="checkbox"/> There were no occupants 4 <input type="checkbox"/> Failed to alert occupants U <input type="checkbox"/> Undetermined			
L2 Detector Type 1 <input checked="" type="checkbox"/> Smoke 2 <input type="checkbox"/> Heat 3 <input type="checkbox"/> Combination smoke - heat 4 <input type="checkbox"/> Sprinkler, water flow detection 5 <input type="checkbox"/> More than 1 type present 0 <input type="checkbox"/> Other U <input type="checkbox"/> Undetermined		L4 Detector Operation 1 <input type="checkbox"/> Fire too small to activate 2 <input type="checkbox"/> Operated (Complete Section L5) 3 <input type="checkbox"/> Failed to Operate (Complete Section L6) U <input checked="" type="checkbox"/> Undetermined		L6 Detector Failure Reason Required if detector failed to operate 1 <input type="checkbox"/> Power failure, shutoff or disconnect 2 <input type="checkbox"/> Improper installation or placement 3 <input type="checkbox"/> Defective 4 <input type="checkbox"/> Lack of maintenance, includes cleaning 5 <input type="checkbox"/> Battery missing or disconnected 6 <input type="checkbox"/> Battery discharged or dead 0 <input type="checkbox"/> Other U <input type="checkbox"/> Undetermined					
M1 Presence of Automatic Extinguishment System * N <input checked="" type="checkbox"/> None Present 1 <input type="checkbox"/> Present Complete rest of Section M		M3 Automatic Extinguishment System Operation Required if fire was within designed range 1 <input type="checkbox"/> Operated & effective (Go to M4) 2 <input type="checkbox"/> Operated & not effective (M4) 3 <input type="checkbox"/> Fire too small to activate 4 <input type="checkbox"/> Failed to operate (Go to M5) 0 <input type="checkbox"/> Other U <input type="checkbox"/> Undetermined		M5 Automatic Extinguishment System Failure Reason Required if system failed 1 <input type="checkbox"/> System shut off 2 <input type="checkbox"/> Not enough agent discharged 3 <input type="checkbox"/> Agent discharged but did not reach fire 4 <input type="checkbox"/> Wrong type of system 5 <input type="checkbox"/> Fire not in area protected 6 <input type="checkbox"/> System components damaged 7 <input type="checkbox"/> Lack of maintenance 8 <input type="checkbox"/> Manual Intervention 0 <input type="checkbox"/> Other U <input type="checkbox"/> Undetermined					
M2 Type of Automatic Extinguishment System * Required if fire was within designed range of AES 1 <input type="checkbox"/> Wet pipe sprinkler 2 <input type="checkbox"/> Dry pipe sprinkler 3 <input type="checkbox"/> Other sprinkler system 4 <input type="checkbox"/> Dry chemical system 5 <input type="checkbox"/> Foam system 6 <input type="checkbox"/> Halogen type system 7 <input type="checkbox"/> Carbon dioxide (CO ₂) system 0 <input type="checkbox"/> Other special hazard system U <input type="checkbox"/> Undetermined		M4 Number of Sprinkler Heads Operating Required if system operated <div style="border: 1px solid black; padding: 2px; display: inline-block;"></div> <small>Number of sprinkler heads operating</small>		NFIRS-3 Revision 01/19/99					

Jan 26 10 05:57p

Barry Gannon

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A FDID * <u>17246</u> State * <u>MA</u> Incident Date * <u>1</u> <u>25</u> <u>2010</u> Station <u>HQ</u> Incident Number * <u>10-0000317</u> Exposure * <u>000</u> <input type="checkbox"/> Delete <input type="checkbox"/> Change NFIRS - 4 Civilian Fire Casualty	
B Injured Person * 1 <input type="checkbox"/> Male 2 <input checked="" type="checkbox"/> Female	
C Casualty * Number <u>1</u>	
First Name <u>[REDACTED]</u> HI Last Name <u>[REDACTED]</u> Suffix <u>[REDACTED]</u>	
D Age or date of birth * <u>70</u> <input type="checkbox"/> Months (for Infants) <u>Age</u> OR <u>Month</u> <u>Day</u> <u>Year</u>	E1 Race 1 <input checked="" type="checkbox"/> White 2 <input type="checkbox"/> Black 3 <input type="checkbox"/> Am. Indian, Eskimo 4 <input type="checkbox"/> Asian 0 <input type="checkbox"/> Other, multi-racial U <input type="checkbox"/> Undetermined E2 Ethnicity <input type="checkbox"/> Hispanic
F Affiliation 1 <input type="checkbox"/> Civilian 2 <input type="checkbox"/> EMS, not fire department 3 <input type="checkbox"/> Police 0 <input type="checkbox"/> Other	
G Date & Time of Injury <u>1</u> <u>25</u> <u>2010</u> <u>18:01:00</u> Midnight is 0000. Month Day Year Hour Minutes	
H Severity * 1 <input type="checkbox"/> Minor 2 <input type="checkbox"/> Moderate 3 <input type="checkbox"/> Severe 4 <input type="checkbox"/> Life threatening 5 <input type="checkbox"/> Death	
I Cause of Injury 1 <input type="checkbox"/> Exposed to fire products including flame heat, smoke, & gas 2 <input type="checkbox"/> Exposed to toxic fumes other than smoke 3 <input type="checkbox"/> Jumped in escape attempt 4 <input type="checkbox"/> Fell, slipped or tripped 5 <input type="checkbox"/> Caught or trapped 6 <input type="checkbox"/> Structural collapse 7 <input type="checkbox"/> Struck by/or contact with object 8 <input type="checkbox"/> Overexertion 9 <input type="checkbox"/> Multiple causes 0 <input type="checkbox"/> Other <input type="checkbox"/> Undetermined	J Human Factors Contributing to Injury <input type="checkbox"/> None Check all applicable boxes 1 <input type="checkbox"/> Asleep 2 <input type="checkbox"/> Unconscious 3 <input type="checkbox"/> Possibly impaired by alcohol 4 <input type="checkbox"/> Possibly impaired by other drug 5 <input type="checkbox"/> Possibly mentally disabled 6 <input type="checkbox"/> Physically disabled 7 <input type="checkbox"/> Physically restrained 8 <input type="checkbox"/> Unattended person
K Factors Contributing to Injury <input type="checkbox"/> None Enter up to three contributing factors Contributing factor (1) <u>[REDACTED]</u> Contributing factor (2) <u>[REDACTED]</u> Contributing factor (3) <u>[REDACTED]</u>	
L Activity When Injured 1 <input type="checkbox"/> Escaping 2 <input type="checkbox"/> Rescue attempt 3 <input type="checkbox"/> Fire control 4 <input type="checkbox"/> Return to fire before control 5 <input type="checkbox"/> Return to fire after control 6 <input type="checkbox"/> Sleeping 7 <input type="checkbox"/> Unable to act 8 <input type="checkbox"/> Irrational act 0 <input checked="" type="checkbox"/> Other U <input type="checkbox"/> Undetermined	M1 Location at Time of Incident 1 <input type="checkbox"/> In area of origin and not involved 2 <input type="checkbox"/> Not in area of origin & not involved 3 <input checked="" type="checkbox"/> Not in area of origin, but involved 4 <input type="checkbox"/> In area of origin and involved U <input type="checkbox"/> Undetermined M2 General Location at Time of Injury Check ONE Box. If undetermined, leave blank and skip to Section N. 1 <input type="checkbox"/> In area of fire origin <u>Skip To Section N</u> 2 <input checked="" type="checkbox"/> In building, but not in area <u>Skip To Section M5</u> 3 <input type="checkbox"/> Outside, but not in area
M3 Story at Time of Incident Complete ONLY if injury occurred INSIDE Story at START of incident <u>1</u> <input type="checkbox"/> Below Grade	
M4 Story Where Injury Occurred Story where injury occurred, if different from M3 <u>1</u> <input type="checkbox"/> Below Grade	
M5 Specific Location at Time of Injury Complete ONLY if casualty NOT in area of origin <u>UU</u> <input type="checkbox"/> Undetermined Specific location at time of injury	
N Primary Apparent Symptom 01 <input type="checkbox"/> Smoke only, asphyxiation 11 <input type="checkbox"/> Burns & smoke inhalation 12 <input type="checkbox"/> Burns only 21 <input type="checkbox"/> Cut, laceration 33 <input type="checkbox"/> Strain or sprain 96 <input type="checkbox"/> Shock 98 <input type="checkbox"/> Pain only Look up code only if the symptom is NOT found above <u>41</u> <input type="checkbox"/> Cardiac symptoms Primary apparent symptom	O Primary Area of Body Injured 1 <input type="checkbox"/> Head 2 <input type="checkbox"/> Neck & shoulder 3 <input type="checkbox"/> Thorax 4 <input type="checkbox"/> Abdomen 5 <input type="checkbox"/> Spine 6 <input type="checkbox"/> Upper extremities 7 <input type="checkbox"/> Lower extremities 8 <input type="checkbox"/> Internal 9 <input type="checkbox"/> Multiple body parts
P Disposition <input type="checkbox"/> Transported to emergency care facility Remarks <u>[REDACTED]</u> Local option <u>[REDACTED]</u> <u>[REDACTED]</u> <u>[REDACTED]</u> <u>[REDACTED]</u> <u>[REDACTED]</u> NFIRS-4 Revision 11/17/96	

17246 01/25/2010 10-0000317

Jan 26 10 05:58p

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A	FDID 17246	State MA	MM 1 DD 25 YYYY 2010	Station HQ	Incident Number 10-0000317	Exposure 000	<input type="checkbox"/> Delete <input type="checkbox"/> Change	NFIRS - 10 Personnel	
B Apparatus or Resource <small>Use codes listed below:</small>		Date and Times <small>Check if same as alarm date</small>			Sent <input checked="" type="checkbox"/>	Number of People	Use <small>Check ONE box for each apparatus to indicate its main use at the incident.</small>	Actions Taken <small>List up to 4 actions for each apparatus and each personnel.</small>	
		<small>Month Day Year Hours/mins</small>							
1	ID C1	Type 92	Dispatch <input checked="" type="checkbox"/> 1 25 2010 18:05	Arrival <input checked="" type="checkbox"/> 1 25 2010 18:09	Clear <input checked="" type="checkbox"/> 1 25 2010 22:30	Sent <input checked="" type="checkbox"/>	0	<input checked="" type="checkbox"/> Suppression <input type="checkbox"/> EMS <input type="checkbox"/> Other	<div style="border: 1px solid black; width: 20px; height: 20px; display: inline-block;"></div> <div style="border: 1px solid black; width: 20px; height: 20px; display: inline-block;"></div>
Personnel ID	Name		Rank or Grade	Attend <input checked="" type="checkbox"/>	Action Taken	Action Taken	Action Taken	Action Taken	
				<input type="checkbox"/>					
				<input type="checkbox"/>					
				<input type="checkbox"/>					
				<input type="checkbox"/>					
				<input type="checkbox"/>					
2	ID E1	Type 11	Dispatch <input checked="" type="checkbox"/> 1 25 2010 18:01	Arrival <input checked="" type="checkbox"/> 1 25 2010 18:04	Clear <input checked="" type="checkbox"/> 1 25 2010 23:07	Sent <input checked="" type="checkbox"/>	0	<input checked="" type="checkbox"/> Suppression <input type="checkbox"/> EMS <input type="checkbox"/> Other	<div style="border: 1px solid black; width: 20px; height: 20px; display: inline-block;"></div> <div style="border: 1px solid black; width: 20px; height: 20px; display: inline-block;"></div>
Personnel ID	Name		Rank or Grade	Attend <input checked="" type="checkbox"/>	Action Taken	Action Taken	Action Taken	Action Taken	
3	ID E2	Type 11	Dispatch <input checked="" type="checkbox"/> 1 25 2010 18:01	Arrival <input checked="" type="checkbox"/> 1 25 2010 18:04	Clear <input checked="" type="checkbox"/> 1 25 2010 23:07	Sent <input checked="" type="checkbox"/>	0	<input checked="" type="checkbox"/> Suppression <input type="checkbox"/> EMS <input type="checkbox"/> Other	<div style="border: 1px solid black; width: 20px; height: 20px; display: inline-block;"></div> <div style="border: 1px solid black; width: 20px; height: 20px; display: inline-block;"></div>
Personnel ID	Name		Rank or Grade	Attend <input checked="" type="checkbox"/>	Action Taken	Action Taken	Action Taken	Action Taken	

17246 FDID	MA State	1 Incident	25 Date	2010	HQ Station	10-0000317 Incident Number	000 Exposure	Responding Units/Personnel
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Unit	Notify Time	Enroute Time	Arrival Time	Cleared Time
Chief	18:05:00	18:07:00	18:09:00	22:30:00
Staff ID\Staff Name	Activity	Rank	Position	Role

E1 Engine 1	18:01:00	18:01:00	18:04:00	23:07:00
Staff ID\Staff Name	Activity	Rank	Position	Role

E2 Engine 2	18:01:00	18:01:00	18:04:00	23:07:00
Staff ID\Staff Name	Activity	Rank	Position	Role

L1 Ladder 1	18:01:00	18:01:00	18:04:00	23:07:00
Staff ID\Staff Name	Activity	Rank	Position	Role

P1 Paramedic 1	18:01:00	18:01:00	18:04:00	23:07:00
Staff ID\Staff Name	Activity	Rank	Position	Role

EXHIBIT 3

National Grid Report on its Investigation of the Incident

Information Request PL 1-2

Respondent: William Mycroft

Request: Provide a sequence of events and a description of the Incident. Include all records that demonstrate: (1) the time National Grid was notified of the Incident; and (2) when Dispatch notified the leak responder, crew and supervisor(s) to report to the Incident. Include in your response documentation on their arrival times; and when National Grid initiated an Emergency Notification to staff.

Response:

January 25, 2010

18:06 - Reading Fire Department contacts company to notify of a possible disturbance.

18:07- CMS technician dispatched at 18:07

18:10 - MSF Supervisor R. Elmstrom notified.

18:20 - First company notification sent out - **"Special Notification - Possible Disturbance - 228 Pleasant St, Reading MA - National Grid MA/NH - Report of a possible disturbance from Reading fire department.**

18:20 - CMS Supervisor M. Verrell notified

18:30 - MSF Supervisor R. Elmstrom arrived

18:34- CMS technician arrived on site

18:45- CMS Supervisor M. Verrell arrived

18:57 - Second notification goes out - **"UPDATE: Abnormal Event - Disturbance - 228 Pleasant St, Reading MA - UPDATE: On scene supervisor reports structural damage to one family house. Inside fire contained by fire department. Gas service interrupted by fire department prior to company arrival. Community Relations notified. Media Relations notified. Gas control notified. Supervisor requesting odorant levels check in the area.**

19:08 - MSF crew dispatched to site.

20:00 - D.P.U. notified.

21:00- D.O.T. notified

MASSACHUSETTS DEPARTMENT OF PUBLIC UTILITIES
GAS NOTIFICATION FOLLOW-UP REPORTING FORM – Page 2 of 2

INCIDENT DATE: 01/25/10

REPORT DATE: 01/25/10

OPERATOR: National Grid

LOCATION: 228 Pleasant St., Reading

INJURIES/FATALITIES:

EMERGENCY RESPONDERS: N/A

OPERATOR PERSONNEL: N/A

GENERAL PUBLIC: Two individuals treated for non serious injuries.

CAUSE(S) (Check all that apply):

THIRD PARTY DAMAGE ____ (Separate Dig Safe Report required, MGL c.82, s.40)

CORROSION ____ EQUIPMENT FAILURE ____ MATERIAL FAILURE ____

PERSONNEL ERROR ____ CI JOINT LEAK ____

OTHER (Explain)

DPU TELEPHONIC NOTIFICATION:

DATE: 01/25/10

TIME: 20:00/20:05

REC'D. BY: Richard Wallace
(voicemail/spoken to)

PHMSA NOTIFICATION: (If applicable)

DATE: 01/25/10

TIME: 21:00

REC'D. BY: Mrs. Arsenault
D.O.T. # 929643

DESCRIPTION: (Include applicable information such as number of people evacuated and duration of evacuation; injuries; estimated damage to operator's facilities and other's persons' property; work being done by operator; work being done by others; depth of facility; etc. Use additional sheets of paper, if necessary)

National Grid received report of possible explosion from Reading Fire Department. Company responded and arrived at approximately 18:37. The gas service had been shut off by fire department prior to National Grid's arrival. Two individuals were treated for non serious injuries. Substantial property damage to residence reported. Company found cracked 6 inch cast iron main in street in front of 22 Manning Street.

MASSACHUSETTS DEPARTMENT OF PUBLIC UTILITIES
GAS NOTIFICATION FOLLOW-UP REPORTING FORM – Page 1 of 2

INCIDENT DATE: 01/25/10

REPORT DATE: 01/25/10

GAS OPERATOR: National Grid

PERSON REPORTING: Victor Santana

PHONE #: 781-466-5484

LOCATION: 228 Pleasant Street, Massachusetts

NOTIFIED BY: Reading Fire Department

OCCURRED AT: am 18:06 pm

NOTIFIED AT: am 18:06 pm

FIRST ARRIVED AT: am 18:37 pm

MADE SAFE AT: am 18:37 pm (prior to company arrival)

INCIDENT TYPE (Check all that apply):

GAS ODOR ____ GAS LEAK ____ CO ____

OUTAGE ____ # OF CUSTOMERS AFFECTED: DURATION:

EVACUATION __x__ # OF PERSONS: 3 DURATION:

UNDER-PRESSURIZATION: ____ OVER-PRESSURIZATION ____

FIRE: ____ EXPLOSION: X

OTHER (Explain):

FACILITIES INVOLVED (Describe all that apply):

MAIN(S): SIZE: 6" MAOP: 2 psig MATERIAL: Cast Iron
SIZE: ____" MAOP: ____ psig MATERIAL: ____

SERVICE(S): SIZE: ____" MAOP: ____ psig MATERIAL: ____
SIZE: ____" MAOP: ____ psig MATERIAL: ____

CUSTOMER FACILITY (Describe):

OTHER (Describe):

Incident Analysis Report

nationalgrid

Incident ID: 59442

Incident Summary

Incident Type: Near-Miss, Public Incident
 Employee Name: Scaparotti, Mark
 Incident Date/Time: 1/25/2010 6:30 PM
 Incident Location: 22 Manning Street, Reading MA
 What Happened: A gas disturbance occurred at 22 Manning Street in Reading, Mass. Gas leak, grade 1.
 Additional Notes:

(NOTE: This IA has attachment(s).)

Incident Analysis

Investigation Status: Investigation Closed Due Date: 03/16/2010 Complete Date: 03/12/2010

Contributing Factors & Action Plan

Contributing Factor	Action Item	Responsible Manager	Due Date	Complete Date	Notes
Engineering Factors - Inadequate or poor design	Examine algorithm used to prioritize mains for replacement.	McPhillips, Jan R	3/1/10	2/3/10	
Human Factors - Communication Issues	Confirm when bill inserts explaining how to recognize and report gas leaks went to customers in Reading. Confirm when the scratch and snuff cards were mailed to Reading customers.	Burnham, Michael S	3/1/10	2/26/10	
Work Environment Factors - Uncontrolled	Investigate origins of unknown patch and determine, if possible, who created it.	Scaparotti, Mark A	3/1/10	2/5/10	
Work Environment Factors - Uncontrolled - Proximity to other utilities					
* Primary Factor					

Lessons Learned

Incident Analysis Team

Incident ID: 59442

Exhibit PL-1-1

<u>Type</u>	<u>Name</u>	<u>Title</u>	<u>Phone</u>
IA Team Leader	Drower, Philip	Manager	631-755-4867
IA Team Member	Aronson, Christopher	Senior Counsel I	781-907-1854
IA Team Member	Burnham, Michael	Sr Safety Rep	401-335-8680
IA Team Member	Distefano, John	Lead Engineer	516-545-3376
IA Team Member	Gallinaro, Michael	Lead Project Manager	718-963-5577
IA Team Member	Scaparotti, Mark	Manager	--
IA Team Member	Shapiro, Arthur	Principal Engineer	516-545-3837
IA Team Member	Zerella, Michael	Manager	516-545-4737

Departments/Areas for Communication Purposes:

- ☐ All Departments
- ☐ Construction & Maintenance Services
- ☐ Facilities
- ☐ Gas
- ☐ Meter
- ☐ OH
- ☐ Stores
- ☐ Substation
- ☐ Transmission
- ☐ Transportation
- ☐ UG

Team Self-Evaluation

Review the analysis and improvement action plan and ask the following:

Communication	Do communication plans clearly indicate who will communicate, what will be communicated, and how it will be communicated?
Clarity	Is the root cause/contributing factors clearly identified?
Root Cause	Does the improvement plan identify and address the root cause of the incident?
Risk Reduction	How effective will the implementation of the action items be in reducing the risk of recurrence?
Responsibility	Are the individual action plans properly assigned?
Retraining	Is the employee involved in the incident receiving appropriate retraining, if applicable?
Due Dates	Are the action item due dates reasonable? How will follow-up before the due date be performed to ensure the item can and will be addressed?

Appendix: List of Available Contributing Factors

☐ **Engineering Factors**

- ☐ Drawing/specification or data error
- ☐ Error in equipment or material selection
- ☐ Inadequate or poor design

☐ **Equipment/Tools/Materials Factors**

- ☐ Defective or failed part/material
- ☐ Error by manufacturer in shipping/markings
- ☐ Inadequate inspection and maintenance
- ☐ Incorrect selection
- ☐ Incorrect use
- ☐ Poor condition

☐ **Golden Rule Violations**

- ☐ Fall Prevention
- ☐ Operation of Vehicles
- ☐ Permits and Authorizations
- ☐ Personal Protective Equipment
- ☐ Safety Protection Systems and Devices
- ☐ Underground Services
- ☐ Work Area Control

☐ **Human Factors**

☐ **Communication Issues**

- ☐ Job brief/risk assessment
- ☐ Unclear expectations
- ☐ Verbal communication problem
- ☐ Work area protection (signs/tags/demarcation etc.)

☐ **Data Issues**

- ☐ EMS update
- ☐ Mapping error

☐ **Did not follow procedures/work practices/instructions/rules**

- ☐ Accepted practice caused a failure to follow procedure or instruction
- ☐ Improper switching order
- ☐ Inadvertent error
- ☐ Inattention to detail
- ☐ Incomplete research
- ☐ Misinterpretation
- ☐ Operated wrong device
- ☐ Order was not followed

- ☐ Fatigue/illness
- ☐ Inadequate knowledge/training
 - ☐ Inadequate content of training
 - ☐ Insufficient practice or hands-on experience
 - ☐ Insufficient refresher training
 - ☐ No training provided
- ☐ Inadequate PPE
 - ☐ Body - Fire retardant clothing
 - ☐ Body - High visibility clothing
 - ☐ Eyes
 - ☐ Fall protection
 - ☐ Feet
 - ☐ Hands
 - ☐ Head
 - ☐ Hearing
 - ☐ Respiratory protection
 - ☐ Rubber gloves/sleeves
- ☐ Management issues
 - ☐ Company culture/leadership issues
 - ☐ Improper resource allocation
 - ☐ Inadequate administrative controls (procedures/policies/standards)
 - ☐ Inadequate communication of procedures/policies/standards/priorities
 - ☐ Inadequate employee selection/placement/qualifications
 - ☐ Inadequate supervision - Experience/development
 - ☐ Inadequate supervision - Knowledge/training
 - ☐ Inadequate supervision - Leadership
 - ☐ Inadequate supervision - Time/resources
 - ☐ Work organization or planning deficiencies
- ☐ Motor Vehicle/Equipment Operation
 - ☐ Avoidance of another vehicle or object
 - ☐ Driving/traffic rules not followed
 - ☐ Encroachment of minimum approach distances
 - ☐ Inadequately secured load
 - ☐ Inappropriate operation of equipment
 - ☐ Inattention/distraction
 - ☐ Unawareness of changing weather and road/driving conditions
- ☐ Poor body positioning
- ☐ Work Environment Factors
 - ☐ Controlled
 - ☐ Housekeeping
 - ☐ Inadequate work area protection
 - ☐ Incorrect management of hazardous substances/atmospheres
 - ☐ Site preparation

Incident ID: 59442

Exhibit PL-1-1

- ☐ Work place
- ☐ Uncontrolled
 - ☐ Condition of terrain
 - ☐ Dense population
 - ☐ Other (describe below)
 - ☐ Proximity to other utilities
 - ☐ Weather conditions

Incident that occurred January 26, 2010, at 22 Manning Street in Reading Mass.

PRIVILEGED AND CONFIDENTIAL ATTORNEY COMMUNICATION

[Note: As of February 5, this incident has not been entered into IMS]

Description

At 6:30 p.m. on Monday, January 26, 2010, National Grid received notification of a disturbance at 228 Pleasant Street in Reading, Mass. The actual address turned out to be 22 Manning Street in Reading.

According to the Reading Fire Department, the fire occurred in the basement of the home. The second floor of the house sustained significant damage, including bowed walls, and the first floor sustained minor damage.

Readings taken about 7 p.m. showed 100 percent gas in sewer manholes on both sides of the house, minimal readings at the water service, and 1 percent gas across the street. Observations at the site were consistent with the assumption that gas reached the basement by flowing along a sewer pipe.

At 9 p.m., National Grid workers exposed a six-inch cast iron main carrying gas pressurized at two pounds. The main was broken, but not completely severed. National Grid employees were asked not to install new pipe until officials from the Massachusetts Department of Public Utilities arrived on site to inspect the old pipe. At 9:50 p.m., the old pipe had been inspected and a clamp was installed. Workers cut out the clamp on the broken main (for analysis), dug out a nearby Grade 3 leak, pressure-tested the service at 22 Manning Street, and cut off the service. The frost line was approximately twelve inches below the surface.

Pleasant Street and Manning Street in Reading were last surveyed by a National Grid leak crew on May 4, 2009. On December 2, 2009, a Grade 3 leak on 217 Pleasant Street was re-checked (according to Mapquest, the driving distance between 217 Pleasant Street and 22 Manning Street is .05 mile, or 264 feet). The homeowner told members of the fire department that he smelled gas in his basement about an hour before the disturbance but did not call anyone to report it; National Grid was not notified about the leak that contributed to the disturbance until after the disturbance had occurred.

There was no recent construction in the street. The only DigSafe on file was for a water main call conducted in 2002, but the water main is believed to be on the opposite side of the street from the gas main. A road patch in the general vicinity of the gas main was observed by National Grid workers – who judged it to be an old patch because of the significant amount of sinkage – but its origins remain unknown.

Root Cause Discussion

Once a timeline of events was established and the facts pertinent to the incident were put forward, a discussion of root causes took place. The discussion addressed seven general categories: procedures, training, quality control, communications, management systems, human engineering, and work direction. Concerns were raised about quality control, communications, and possibly training and human engineering:

Quality control – It was stated that the Malden area has more main breaks than any other National Grid region in New England, with approximately 35 in the last year. Team members asked how mains are identified for replacement, and were told an algorithm is used that considers the age of the pipe, the number of leaks per mile, the levels of each known leak on the main, and several other factors. The main that contributed to the 22 Manning Street disturbance was not on the list to be replaced; once the disturbance occurred, however, the main was placed on the list. Discussion ensued about whether the algorithm – or any algorithm – can and should predict every disturbance. Ian McPhillips volunteered to examine the algorithm, describe all its components, and do a general evaluation of its effectiveness in assigning priority to main replacements.

Communications – The homeowner smelled gas but did not report a gas leak either to National Grid or to the local fire or police departments. This raised the question about communications with homeowners. General sentiment among team members was that a flyer describing how to detect and report a gas leak had been included as a mailer in a recent billing. Mike Burnham volunteered to find out what the communication was, when it went out, and whether, as believed, it included customers in Reading.

Training and Human Engineering – These concerns related to the origin-unknown patch on the street. If the origin can be determined, the next step will be to establish who served as the Foreign Opening Inspector (FOI) during the work, what that person's training was (and should have been), and what human performance or human engineering factors may have influenced him or her during the task. Mark Scaparotti volunteered to continue researching the origin of the street patch and employees who may have been associated with it as FOIs.

Exhibit 4

State Fire Marshal Report

Fire Investigation Summary Report

Case Number: 2010-117-0249
Controlling Case Number: None
Case Type: F52 Fire - Post Blast/Residential

Report Creator: Peter D Bramante
Lead Investigator(s): Peter D BRAMANTE Team: North

FIU Requested By: Lt Paul Jackson from Reading Fire Department
FIU Requested On:

Date and Time of Incident: 01/25/2010 at approximately 18:40 PM
Address/ Location of Incident: 22 Manning St Reading, MA

Property Investigated

Type of Investigation: Explosion
Type of Property: Residential

Protection Systems :

Smoke Detector: Operational

Comments: 2 1/2 story wood frame structure with pitched asphalt shingle roof , wood clapboard siding and poured concrete foundation with full basement . 1 1/2 story in-law apartment attached to D side of structure . A side entrances to both the house (concrete landing) and in-law apartment (wooden steps). B side wooden steps to first floor (kitchen) at B/C corner. No entrances on C side , with three A/C units on ground . D side bulkhead to basement . Electric drop on second floor B /C corner. Electric stove in main residence .

Fire Source

Cause of Fire: Accidental

Ignition: Most probable ignition source from gas heating system

Material Ignited: Natural gas; Class A common combustibles : wood, plastics, papers

Explanation:

On the above date and time, I was contacted by Trooper Sheryl O'Donnell of the Massachusetts State Police Fire and Explosion Investigation Unit regarding a request by the Reading Fire Department to assist with an origin and cause investigation at a house explosion at 22 Manning Street in Reading, MA. Upon arrival, I was met by Reading Fire Lt Paul Jackson outside the house. Also on scene were Reading Fire Chief Greg Burns, and Reading Police Detective Mike Saunders. During the scene examination, we were joined by Massachusetts State Police Sgt Peter Cummings, National Grid Director of Field Operations Gary Bennett, and Jorge Santi and Robbie McCabe, both members of the Massachusetts Department of Public Utilities. The house explosion had also caused a fire in the basement, which had been suppressed. Minor overhaul operations had been conducted to check for fire spread.

The building was a 2 1/2 story wood frame structure with a pitched asphalt shingle roof, wood clapboard siding and a poured concrete foundation with a full basement. There was also a 1 1/2 story in-law apartment attached to the D side of the structure. There were two entrances on the A side of the house, with one to the main house (concrete landing), and one to the in-law apartment (wooden steps). On the B side there were wooden steps to first floor (kitchen) at the B/C corner. There were no entrances on the C side, with three A/C units on the ground. There was a bulkhead entrance to the basement on the D side. The electric drop was located on the second floor B/C corner. There was an electric stove located in the kitchen of the main residence. A gas-fueled heating system was located in the basement along the center of the C wall. There were two sewer line cleanouts in the basement with one located beside the furnace along the C wall, and the second cleanout located along the center of the A wall. There was also a crack in the concrete slab in the basement, running from the center of the A wall to the center of the C wall.

Fire Investigation Summary Report

The kitchen door to the basement was blown into the kitchen. A pocket door separating the living room from the in-law apartment had been blown into the in-law apartment, along with part of the wall adjacent to the pocket door. On the second floor, the B wall was beveled out at the floor. The entire ceiling on the second floor had been displaced upwards due to the deflagration. The most likely point of ignition was believed to be the gas-fueled furnace located in the basement. High natural gas readings were recorded by National Grid workers in the basement after the fire and explosion. Also, multiple witnesses stated that there had been natural gas odors in the neighborhood for years. National Grid also stated there was an existing Level 3 leak in the area for some time.

As a result of our scene examination, coupled with witness interviews, it is my opinion and the collective opinion of the other investigators with whom I worked, that the cause of this fire was accidental. Further, we opine that in all probability the cause of this explosion and subsequent fire was a migration of gas vapors from a cracked six-inch gas main on the street through the soil and into the basement. The vapors most likely entered the basement through the two sewage drain lines as well as the crack in the basement floor. The most likely ignition source, as stated previously, was the furnace located in the basement. All other possible sources of accidental ignition were eliminated. Further, there is no evidence to suggest or information to indicate that this fire was intentionally set. Case closed.

Evidence

No Evidence

Photos

Taken By: Police Department

Description / Explanation / Comments:
Det. Mike Saunders

K-9

K-9 Not Used

Occupants

Strandberg, Thomas J -- 22 Manning St Reading, MA 00000
[REDACTED]

Strandberg, Deborah -- 22 Manning St Reading, MA 00000
[REDACTED] SSN: Unknown, Phone: Unknown

Strandberg, Mildred -- 22 Manning St Reading, MA 00000
[REDACTED] SSN: Unknown, Phone: Unknown

Injuries

Strandberg, Deborah -- 22 Manning St Reading, MA 00000
[REDACTED] SSN: Unknown, Phone: Unknown, Injury Status: Injured -- Occupant

Strandberg, Mildred -- 22 Manning St Reading, MA 00000
[REDACTED] SSN: Unknown, Phone: Unknown, Injury Status: Injured -- Occupant

Owner

Fire Investigation Summary Report

Strandberg, Thomas J -- 22 Manning St Reading, MA 00000
[REDACTED] [REDACTED] [REDACTED]

Reported By

Strandberg, Thomas J -- 22 Manning St Reading, MA 00000
[REDACTED] [REDACTED] [REDACTED]

Powers, Chris -- 235 Pleasant St Reading, MA 00000
[REDACTED] [REDACTED]

Discovered By

Strandberg, Thomas J -- 22 Manning St Reading, MA 00000
[REDACTED] [REDACTED] [REDACTED]

Witnesses

Strandberg, Thomas J -- 22 Manning St Reading, MA 00000
[REDACTED] [REDACTED] [REDACTED]

Strandberg, Deborah -- 22 Manning St Reading, MA 00000
[REDACTED] [REDACTED]

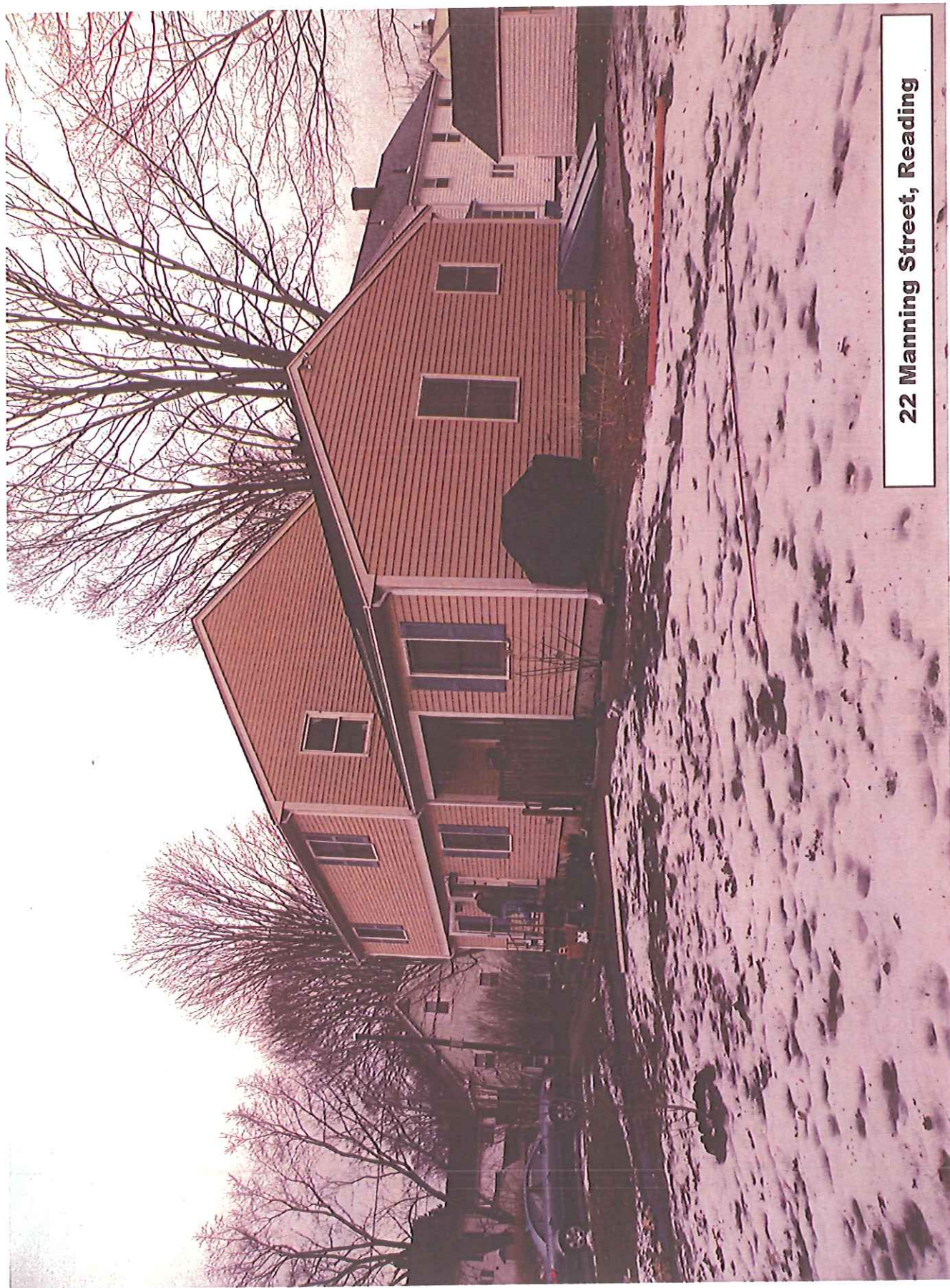
Strandberg, Mildred -- 22 Manning St Reading, MA 00000
[REDACTED] [REDACTED]

Powers, Chris -- 235 Pleasant St Reading, MA 00000
[REDACTED] [REDACTED]

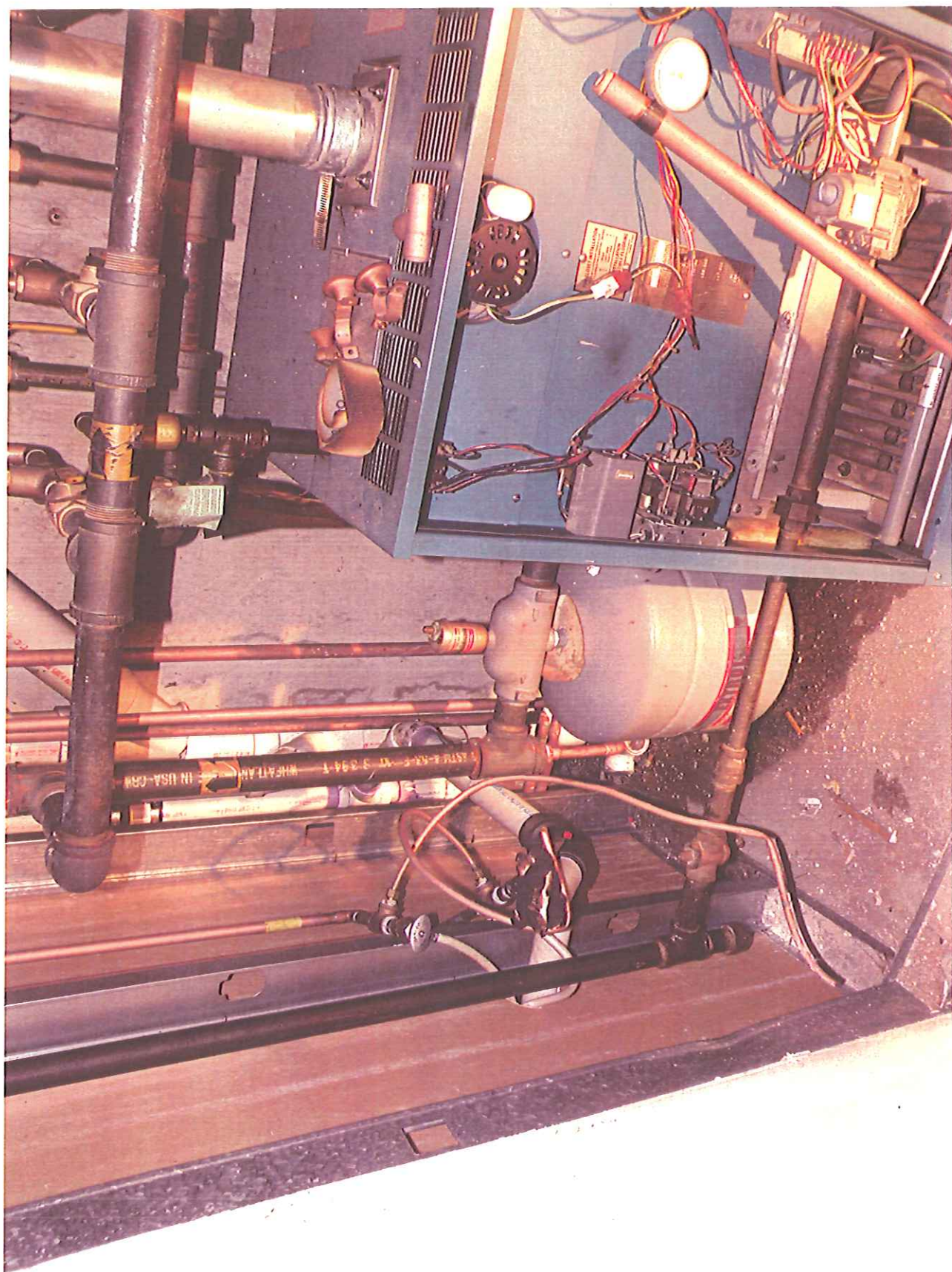
Donovan, Russell -- Pleasant St Reading, MA 00000
[REDACTED] [REDACTED]

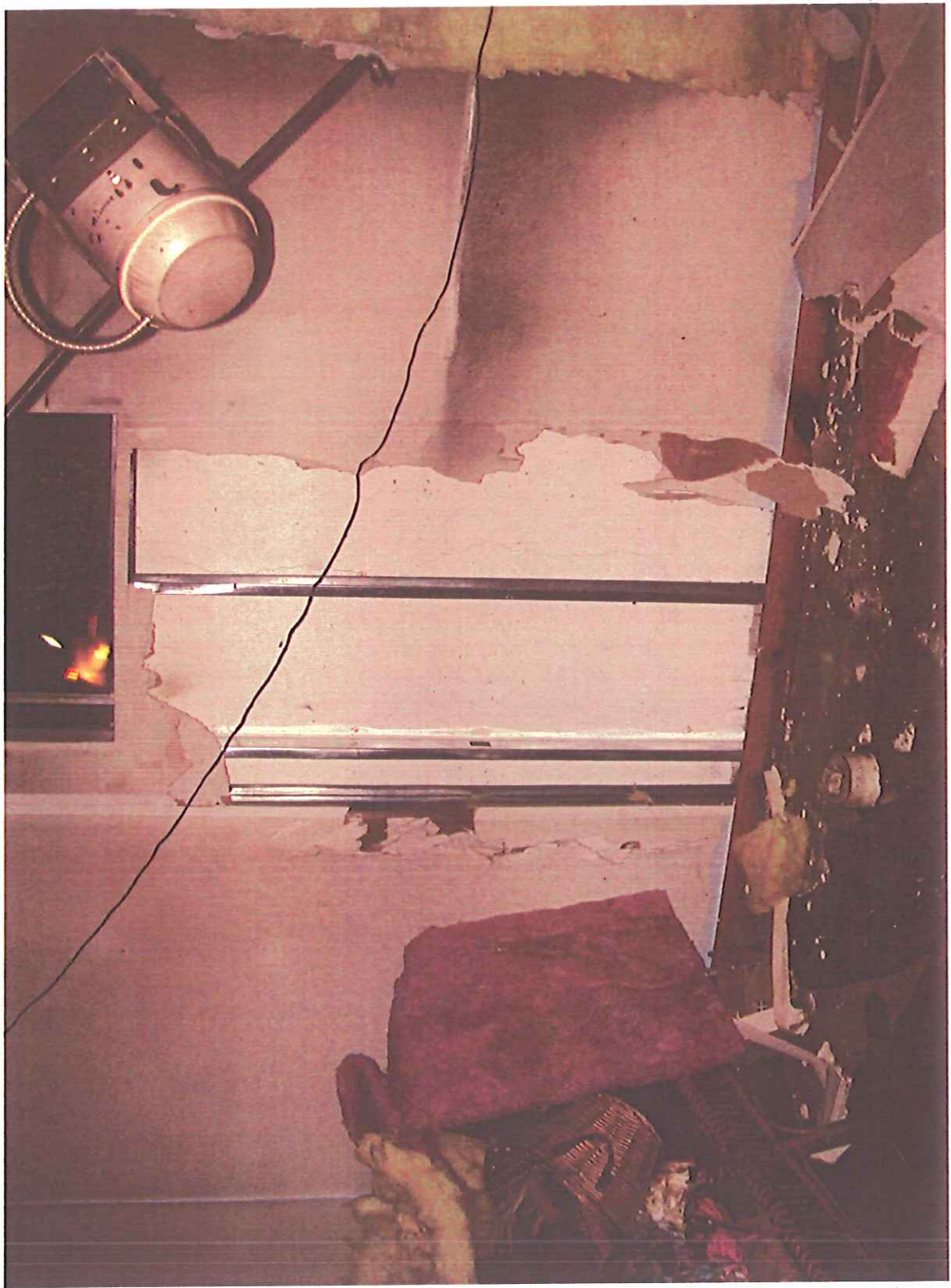
Exhibit 5

Photographs of the Incident



22 Manning Street, Reading







Clamp on main on Pleasant Street, Reading
(across the street from 22 Manning Street).

Exhibit 6

Summary of Records of Gas Mains

Information Request PL 1-4

Respondent: James Hughes

Request: Provide records for the gas mains on Pleasant Street, Pleasant Street Extension and Manning Street, Reading, including but not limited to, installation date, MAOP, leak history from January 1, 2005 to January 25, 2010, and operating pressure at the time of the Incident.

Response:

- Installation Date =
 - Manning St = 1930, 1931, 1958
 - Pleasant St = 1930
 - Pleasant St Ext = 1930
- MAOP = 2 psig
- Leak History =
 - Manning St
 - 1 joint repair at #20 on 03/02/2006
 - Pleasant St
 - Broken main repair at #228 on 01/25/2010
 - 1 joint repair at #228 on 01/27/2010
 - 1 joint repair at #217 on 02/01/2010
 - 3 joint repairs at #229 on 04/27/2009
 - 3 joint repairs at #206 on 03/14/2006
 - Pleasant St Extension
 - No leak repair history
- Operating pressure at the time of the incident = 1.8 psig

Exhibit 7

Leakage Survey Maps

Information Request PL 1-11

Respondent: Michael Verrell

Request: Provide a map identifying the streets and boundaries that National Grid conducted leak surveys (flame ionization unit) on January 25, 2010, in the vicinity of the Incident. Identify in this map those areas that National Grid conducted a walking survey and those areas where the Operator conducted a mobile survey.

Response: National Grid conducted a walking survey on Pleasant Street, Pleasant Street Extension and Manning Street after the incident on 1/25/10. National Grid also performed a mobile survey of Eaton Street, Smith Avenue and Azalea Circle on 1/25/10. National Grid then performed mobile surveys of Pleasant Street, Pleasant Street Extension and Manning Street twice a day from 1/26/10 through 2/1/10 and continued daily mobile surveys of Pleasant Street and Pleasant Street Extension through 2/15/10.

Information Request PL 2-9

Respondent: Scott Croker

Request: Refer to response to IR-PL-1-11. Provide a map identifying the streets and boundaries that National Grid conducted leak surveys (flame ionization unit) on January 25, 2010, in the vicinity of the Incident. Identify in this map those areas that National Grid conducted a walking survey and those areas where the Operator conducted a mobile survey.

Response: Attached as Exhibit PL 2-9, please find a copy of map identifying those areas that National Grid conducted leak surveys on January 25, 2010.

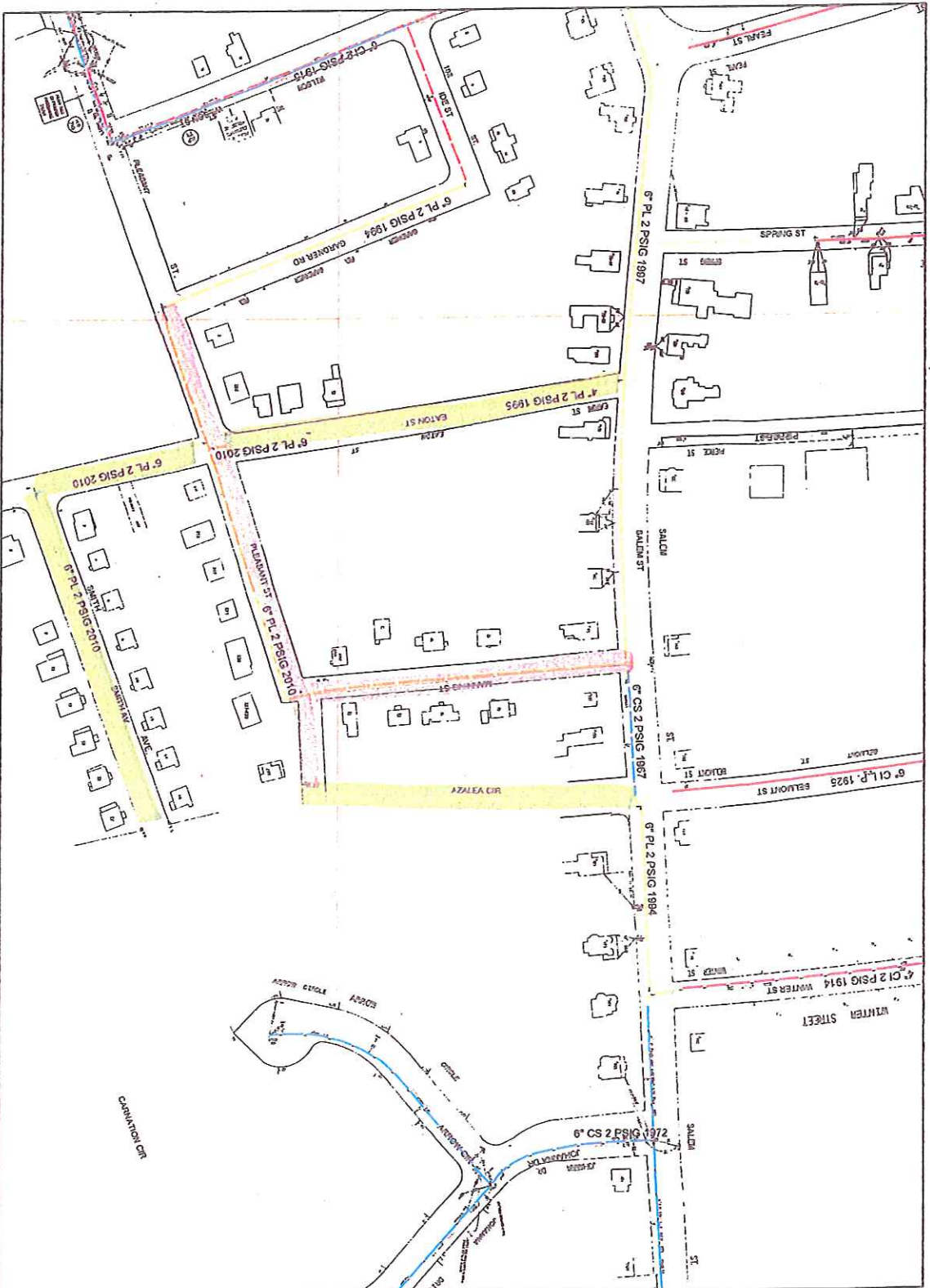
Reading, MA - Manning St. Area

Distribution Main

<all other values>

Subtype, Pressure Class

- Baro Steel, High Pressure
- Baro Steel, Intermediate Pressure
- Baro Steel, Low Pressure
- Baro Steel, Transmission Pressure
- Baro Steel, Unknown
- Cast Iron, High Pressure
- Cast Iron, Intermediate Pressure
- Cast Iron, Low Pressure
- Cast Iron, Unknown Pressure
- Coated Steel, High Pressure
- Coated Steel, Intermediate Pressure
- Coated Steel, Low Pressure
- Coated Steel, Transmission Pressure
- Coated Steel, Unknown Pressure
- Copper, Low Pressure
- Copper, Unknown Pressure
- High Density Plastic, High Pressure
- High Density Plastic, Intermediate
- High Density Plastic, Low Pressure
- High Density Plastic, Transmission Pressure
- High Density Plastic, Unknown Pressure
- Plastic, High Pressure
- Plastic, Intermediate Pressure
- Plastic, Low Pressure
- Plastic, Transmission Pressure
- Plastic, Unknown Pressure
- Wrought Iron, High Pressure
- Wrought Iron, Intermediate Pressure
- Wrought Iron, Low Pressure
- Wrought Iron, Unknown
- Unknown, High Pressure
- Unknown, Intermediate Pressure
- Unknown, Low Pressure
- Unknown, Unknown



national grid

AMMS

Walking a mobile twice daily 1/26/10 thru 2/1/10
 Mobil survey 1/25/10



NOTE 1: The location of service pipes and connection components are not guaranteed to be correct. They are not as original record information. Should be verified for the information.
 NOTE 2: The main in 1874 without dimensions are not drawn to scale. These main are intended to show the existence of gas main on the street and do not reflect the exact location of the main in the street.

Exhibit 8

Post-Incident Reported Leaks and Repairs

MASSACHUSETTS LEAK INVESTIGATION REPORT

Date/Time: 01/27/10 Premark Date: _____ Company Code: _____
Hse #: 355 Prefix: _____ On Street: South St Suffix: _____ Maximo #: _____
LMS # _____ Prefix: _____ Cross St: Main St Suffix: _____ Town: RDG

Leak classified by: 13526

Leak Classification

1	X	2A		2		3	
---	---	----	--	---	--	---	--

Leak Area

Rural		Real	X	Urban
-------	--	------	---	-------

Leak Source

Project

Public	136	X
Employee	136	
Winter Patrol	146	
Summer FI	140	
Pre Pave	134	
CI Encroach	128	
Recheck	132	
Special	138	X
Walking	144	
Contractor	142	
Building	130	
Bus. District	130	

Leak Standby

Yes	X	No	
-----	---	----	--

Meter Location

In		Out	X
----	--	-----	---

Odor Present

Yes	<input checked="" type="checkbox"/>	No	<input type="checkbox"/>
-----	-------------------------------------	----	--------------------------

Method of Test

Portable FI	
Mobile FI	X
CGI	X
Selected Test	
Other	

Pressure

LP		IP	X	HP		TP		Unknown
----	--	----	---	----	--	----	--	---------

Leak In Continuously Paved Area

Yes		No	X
-----	--	----	--------------

Premise Condition Rpt

Yes	<input checked="" type="checkbox"/>	No	<input type="checkbox"/>
-----	-------------------------------------	----	--------------------------

Cover

Asphalt	X
Concrete	
Brick	
Gravel	
Soil/Grass	
Other	

Facility

Main	X
Service	
Drip	
Curb Valve	
Main Valve	
Other	

	Type Code	Reading % Gas	Front / Back Distance	Front / Back Location Code	Left / Right Distance	Left / Right Location Code
1	B-01	N/A				
2	C-01	2%	2'	FFW	13'	RLBL
3	B-01	3/4%				
4	C-12	9.0%	43'	FFW	8'	LRBL
5	B-01	1/2%	53'	FFW	56'	LLBL
6	C-01	0%	2'	FFW	16'	LRBL
7	C-12	50%	42'	FFW	52'	LLBL
8						
9						
10						
11						
12						
13						
14						

Comments: Grade 1 leak 26-2' from end wall outside @ #355 south + 3/4" 1/2" water service @ #357 south st. leak appears to be on main.

Completed by (signature): M. Taylor Employee #: 13526

Consultant Company: _____

MASSACHUSETTS LEAK INVESTIGATION REPORT

Date/Time: 1-28-10 Premark Date: _____ Company Code: _____
Hse #: 643 Prefix: _____ On Street: MAIN Suffix: ST Maximo #: _____
LMS # _____ Prefix: _____ Cross St: PLEASANT Suffix: _____ Town: READING

Leak classified by:

Leak Standby
Yes ☒ No ☐

Meter Location
In ☒ Out ☐

Odor Present
Yes ☒ No ☐

Method of Test

Portable FI ☒
Mobile FI ☒
CGI ☒
Selected Test _____
Other _____

Leak Classification
1 ☒ 2A ☐ 2 ☐ 3 ☐

Pressure
LP ☒ IP ☐ HP ☐ TP ☐ Unknown ☐

Leak in Continuously Paved Area
Yes ☒ No ☐

Cover
Asphalt ☒
Concrete _____
Brick _____
Gravel _____
Soil/Grass _____
Other _____

Leak Area
Rural ☐ Real ☒ Urban ☐

Premise Condition Rpt
Yes ☒ No ☐

Facility
Main ☒
Service _____
Drip _____
Curb Valve _____
Main Valve _____
Other _____

Leak Source	Project
Public	136 <input checked="" type="checkbox"/>
Employee	136 <input checked="" type="checkbox"/>
Winter Patrol	146
Summer FI	140
Pre Pave	134
CI Encroach	128
Recheck	132
Special	138
Walking	144
Contractor	142
Building	130
Bus. District	130

Handwritten sketch of a street layout on a grid. It shows a horizontal street labeled 'MAIN ST' and a vertical street labeled 'PLEASANT ST'. There are some handwritten notes and markings on the grid, including 'READING' and 'MAIN ST' written multiple times.

	Type Code	Reading % Gas	Front / Back Distance	Front / Back Location Code	Left / Right Distance	Left / Right Location Code
1	B-01	10	1/5			
2	C-01					
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						
13						
14						

Comments: 10G @ GAS SERVICE 1/4G @ WATER SERVICE

Completed by (signature): Jim Lambert Employee #: 23203

Consultant Company: _____

MASSACHUSETTS LEAK INVESTIGATION REPORT

Date/Time: 1/25/10 Premark Date: _____ Company Code: 06C
 Hse #: 228 Prefix: _____ On Street: Pleasant Suffix: St Maximo #: _____
 LMS # _____ Prefix: _____ Cross St: Manary Suffix: St Town: Rdg

Leak classified by:

Leak Standby
 Yes ☒ No ☐

Meter Location
 In ☐ Out ☒

Odor Present
 Yes ☒ No ☐

Method of Test
 Portable FI ☒
 Mobile FI ☐
 CGI ☒
 Selected Test ☐
 Other ☐

Leak Classification
 1 ☒ 2A ☐ 2 ☐ 3 ☐

Leak Area
 Rural ☐ Resi ☒ Urban ☐

Pressure
 LP ☐ IP ☒ HP ☐ TP ☐ Unknown ☐

Leak In Continuously Paved Area
 Yes ☐ No ☒

Premise Condition Rpt
 Yes ☐ No ☒

Cover
 Asphalt ☒
 Concrete ☐
 Brick ☐
 Gravel ☐
 Soil/Grass ☐
 Other ☐

Facility
 Main ☒
 Service ☐
 Drip ☐
 Curb Valve ☐
 Main Valve ☐
 Other ☐

Leak Source	Project
Public	136 <input checked="" type="checkbox"/>
Employee	136
Winter Patrol	146
Summer FI	140
Pre Pave	134
CI Encroach	128
Recheck	132
Special	138
Walking	144
Contractor	142
Building	130
Bus. District	130

Handwritten notes on grid:

228 241

Pleasant St

228/229

235

	Type Code	Reading % Gas	Front / Back Distance	Front / Back Location Code	Left / Right Distance	Left / Right Location Code
1	B-01	26%				
2	C-01					
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						
13						
14						

Comments: House Explosion at 228, 37% H 235 water service,
2% at #229 water service. 1% at #24 Azalea Cr sewer line

Completed by (signature): T. Kwan Employee #: 12679

Consultant Company: _____

MASSACHUSETTS LEAK INVESTIGATION REPORT

Date/Time: 1/26/10 12:15 P.M. Premark Date: _____ Company Code: _____
Hse #: 355 Prefix: _____ On Street: South Suffix: ST Maximo #: _____
LMS #: _____ Prefix: _____ Cross St: _____ Suffix: _____ Town: RDG

Leak classified by: 15733

Leak Standby
Yes ☐ No ☒

Meter Location
In ☐ Out ☒

Odor Present
Yes ☐ No ☒

Method of Test
Portable FI ☒
Mobile FI ☐
CGI ☒
Selected Test ☐
Other ☐

Leak Classification				Leak Area	
1	<input checked="" type="checkbox"/> 2A	2	3	Rural	Residential <input checked="" type="checkbox"/> Urban
Pressure					
LP	IP	<input checked="" type="checkbox"/> HP	TP	Unknown	
Leak in Continuously Paved Area					
Yes		<input checked="" type="checkbox"/> No		Premise Condition Rpt	
Yes		<input checked="" type="checkbox"/> No		Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	
Cover			Facility		
Asphalt <input checked="" type="checkbox"/>			Main <input checked="" type="checkbox"/>		
Concrete <input type="checkbox"/>			Service <input checked="" type="checkbox"/>		
Brick <input type="checkbox"/>			Drip <input type="checkbox"/>		
Gravel <input type="checkbox"/>			Curb Valve <input type="checkbox"/>		
Soil/Grass <input checked="" type="checkbox"/>			Main Valve <input type="checkbox"/>		
Other <input checked="" type="checkbox"/>			Other <input type="checkbox"/>		

Leak Source	Project
Public	136
Employee	136
Winter Patrol	146
Summer FI	140
Pre Pave	134
CI Encroach	128
Recheck	132
Special	138
Walking	144
Contractor	142
Building	130
Bus. District	130

#357	#355	
X-3	X-1	
	X-2	
		South ST ← →

	Type Code	Reading % Gas	Front / Back Distance	Front / Back Location Code	Left / Right Distance	Left / Right Location Code
1	B-01	0%	N/A	N/A	N/A	N/A
2	C-01	36%	1'	FSW	G	RLBL
3	B-01	2%	N/A	N/A	N/A	N/A
4						
5						
6						
7						
8						
9						
10						
11						
12						
13						
14						

Comments: My X-3 is inside HSE #357 at the water service.
Found leak during Riser Inspection. Possible 2 leaks.
Frost Conditions.

Completed by (signature): J. Marazzi Employee #: 15733

Consultant Company: _____

LEAKS REPORTED

LEAK NO	RPT ST NUMBER	RPT ST PFX	RPT ST NAME	RPT ST SFX	RPT TOWN	OPERATION AREA	CLASS	RPT DATE
330075	228		PLEASANT	ST	RDG	MSFMAL	1	01/25/2010 12:00:00 AM
330809			PLEASANT	ST	RDG	MSFMAL	2	01/26/2010 12:00:00 AM
330246	625		MAIN	ST	RDG	MSFMAL	1	01/28/2010 12:00:00 AM
330121	355		SOUTH	ST	RDG	MSFMAL	1	01/26/2010 12:00:00 AM
330171	355		SOUTH	ST	RDG	MSFMAL	1	01/27/2010 12:00:00 AM
330165			PRESCOTT	ST	RDG	MSFMAL	3	01/26/2010 12:00:00 AM

LEAKS REPAIRED BY DIVISION

WONUM	LEAK NO	TOWN	ST #	PFX	ST NAME	SFX	CLASS	RPRD DATE	DIVISION
712592	330246	RDG	625		MAIN	ST	1	01/29/2010 12:00:00 AM	MSFMAL
714320	330809	RDG	22		MANNING	ST	2	01/26/2010 12:00:00 AM	MSFMAL
712155	330075	RDG	228		PLEASANT	ST	1	01/25/2010 12:00:00 AM	MSFMAL
712155	330075	RDG	228		PLEASANT	ST	1	01/27/2010 12:00:00 AM	MSFMAL
712270	330121	RDG	355		SOUTH	ST	1	01/26/2010 12:00:00 AM	MSFMAL
712431	330171	RDG	355		SOUTH	ST	1	01/27/2010 12:00:00 AM	MSFMAL
712422	330165	RDG			PRESCOTT	ST	3	not repaired	MSFMAL

Exhibit 9

Winter Patrol Leak Surveys 2005 to 2010

Information Request PL 1-6

Respondent: Brian Cotting

Request: Provide all documentation memorializing the leakage surveys conducted on Pleasant Street, Pleasant Street Extension and Manning Street from December 1, 2005 to January 25, 2010 pursuant to National Grid's Winter Patrol Procedures. Include in your response a copy of the Operator's Winter Patrol Procedures.

Response: Below please find a summary of National Grid's Winter Patrol surveys conducted on Pleasant Street, Pleasant Street Extension and Manning Street from December 1, 2005 to January 25, 2010. Please see attached as Exhibit PL 1-6, copies National Grid's Winter Patrol Procedures for relevant time periods.

Winter Patrols

Winter Patrols 2005-2006

12/30/2005
1/9/2006
1/11/2006
1/19/2006
1/21/2006
1/31/2006,
2/1/2006
2/2/2006
2/16/2006
2/18/2006
2/27/2006
3/1/2006
3/08/2006

Winter Patrol 2006-07

2/07/2007
2/13/07
2/14/2007
2/23/2007
3/14/2007

Winter Patrol 2008-2009

1/16/2009
1/29/2009
2/5/2009

National Grid
National Grid's Responses to the Department's First Set of Information Requests
March 12, 2010

2/6/2009
2/11/2009
2/18/2009
2/23/2009
2/27/2009
3/5/2009
3/11/2009
3/18/2009
3/25/2009
3/26/2009

Exhibit 10

Pressure Test of Service to 22 Manning Street, Reading

EXHIBIT 10 PRESSURE TEST OF SERVICE LINE TO 22 MANNING STREET, READING (1-26-10)



On January 26, 2010, National Grid pressure tested the 1-inch service line supplying gas to 22 Manning Street, Reading for 15 minutes at 90 pounds per square inch gauge. I observed no loss in pressure.

Robert McCabe

Robert McCabe, Department of Public Utilities
Pipeline Engineering and Safety Division

Work Order <input type="text" value="714320"/>		WorkType <input type="text" value="LR"/>		Status <input type="text" value="CASBUILT"/>	
Location <input type="text" value="824159"/>		<input type="text" value="22 MANNING ST,RDG"/>		Town <input type="text" value="RDG"/>	
Operation <input type="text" value="20"/>		Standard Unit <input type="text"/>		Count <input type="text" value="1"/>	
Loc <input type="text" value="824159"/>		<input type="text" value="22 MANNING ST,RDG"/>		Completion Date <input type="text" value="2010-01-26-0.0"/>	
Repairs					
Work Action <input type="text" value="LEAK"/>	Paving Code <input type="text"/>	# Main FT Inspected <input type="text"/>	Repair sent to LMS? <input type="text" value="Y"/>		
Joint Seal Replaced? <input type="text"/>		Type of Joint Replaced <input type="text"/>	Reason for Failure <input type="text"/>		
Facility Type <input type="text" value="SERVICE"/>	Size <input type="text" value="01"/>	Material <input type="text" value="PL"/>	Pressure <input type="text"/>		
Where Leak <input type="text" value="LKPIPE"/>	Leak Cause <input type="text" value="OTHER"/>	Contributing Factor <input type="text"/>	Depth <input type="text" value="3"/>		
Comments <input type="text"/>		Construction Type <input type="text"/>			
Relights					
RGO Performed? <input type="text"/>	House Heaters <input type="text"/>	Water Heaters <input type="text"/>			
Standby? <input type="text"/>	Ranges <input type="text"/>	Other <input type="text"/>			
Reconnect? <input type="text"/>	Comments <input type="text"/>				
Pressure Test			Valve Inspections		
Pressure <input type="text"/>	Medium <input type="text"/>	Primary Valve? <input type="text"/>	Location Verified? <input type="text"/>	Valve Greased <input type="text"/>	
Duration <input type="text"/>	Chart? <input type="text"/>	Valve Box Cleaned <input type="text"/>	Valve Operability? <input type="text"/>	CGI Reading (% Gas) <input type="text"/>	
Comments <input type="text"/>					

Exhibit 11

Summary of All Leak Surveys from 2005 to 2012

Information Request PL 1-5

Respondent: Brian Cotting

Request: Provide the Division with all documentation memorializing the leakage surveys conducted on Pleasant Street, Pleasant Street Extension and Manning Street, re from December 1, 2005 to January 25, 2010.

Response:

Below please find a summary National Grid's the leakage surveys conducted on Pleasant Street, Pleasant Street Extension and Manning Street from December 1, 2005 to January 25, 2010.

Walking Surveys

2005 8/25/2005

2008 Walking Survey 4/2008-6/2008 (National Grid performed walking survey of entire town during this timeframe including Pleasant Street, Pleasant Street Extension and Manning Street)

Mobile Surveys (of entire town of Reading)

Mobile Survey 2007

3/19, 3/20, 3/21, 3/22, 3/23, 3/27/2007

Mobile Survey 2009

5/1, 5/9, 5/5, 5/6

Winter Patrols

Winter Patrols 2005-2006

12/30/2005

1/9/2006

1/11/2006

1/19/2006

1/21/2006

1/31/2006,

2/1/2006

2/2/2006

2/16/2006

2/18/2006

2/27/2006

National Grid
National Grid's Responses to the Department's First Set of Information Requests
March 12, 2010

3/1/2006
3/08/2006

Winter Patrol 2006-07

2/07/2007
2/13/07
2/14/2007
2/23/2007
3/14/2007

Winter Patrol 2008-2009

1/16/2009
1/29/2009
2/5/2009
2/6/2009
2/11/2009
2/18/2009
2/23/2009
2/27/2009
3/5/2009
3/11/2009
3/18/2009
3/25/2009
3/26/2009

Spring Monitoring

2006 Monitoring

Grade 3 leaks on Pleasant Street were re-checked on 4/27/06, leak at 206 Pleasant Street had been repaired and leak at 97 Pleasant Street (remained Grade 3)

2007 Monitoring

Grade 3 leak at 97 Pleasant Street re-checked on 9/6/07 (remained Grade 3)

2008 Monitoring

Grade 3 leak at 97 Pleasant Street re-checked on 10/10/08 (remained Grade 3)

2009 Monitoring

Grade 3's at 97 and 217 Pleasant Street were re-checked on 12/2/09 (remained Grade 3's)

Exhibit 12

Odorant Level Tests

DISTINCT ODOR LEVEL TESTS

Performed by: Propane & Gas Conditioning Group (North)

LOCATION	Distribution System	Test Conducted By	Test Date	Odorator Serial #	Odorator Calibration Date	Odorator Threshold Reading	% Gas Converted Threshold	Odorator Distinct Reading	% Gas Converted Distinct	REMARKS:
#24 Winthrop Fire Station 40 Pauline St. Winthrop	Mystic	ESR	12-2-09	1991-3	04-09	.06	.06	.12	.12	
#25 Arlington Fire Station 1 Monument Pk. Arlington	Mystic	ESR	12-4-09	1991-3	04-09	.07	.07	.12	.12	
#26 Lexington Air Base Grenier St. Lexington	Mystic	ESR	12-4-09	1991-3	04-09	.05	.05	.10	.10	
#27 Burlington Fire Station 140 Terrace Hill Burlington	Mystic	ESR	12-2-09	1991-3	04-09	.06	.06	.12	.12	
#28 Reading Fire Station 267 Woburn St. Reading	Mystic	ESR	12-2-09	1991-3	04-09	.06	.06	.13	.13	
#29 Wakefield Fire Station 5 Oak St. Wakefield	Mystic Town of Wakefield	ESR	12-2-09	1991-3	04-09	.05	.05	.11	.11	
#34 Lynnfield Fire Station 55 Summer St. Lynnfield	Lynn	ESR	12-4-09	1991-3	04-09	.04	.04	.10	.10	
#49 Reading Take Station Lowell St. Reading	TGP	ESR	12-1-09	1991-3	04-09	.07	.07	.12	.12	

Route #41

DISTINCT ODOR LEVEL TESTS Performed by: Propane & Gas Conditioning Group (North)

LOCATION	Distribution System Tested	Test Conducted By	Test Date	Odorator Serial #	Odorator Calibration Date	Odorator Threshold Reading	% Gas. Converted Threshold	Odorator Distinct Reading	% Gas. Converted Distinct	REMARKS:
#24 Winthrop Fire Station 40 Pauline St. Winthrop	Mystic	Jm hulacay	1-25-10	1991-3	5/09	.08		.10		
#25 Arlington Fire Station 1 Monument Pk. Arlington	Mystic	Jm	1-25-10	1991-3	5/09	.67		.10		
#26 Lexington Air Base Genier St. Lexington	Mystic	Jm	1-25-10	1991-3	5/09					denied access
#27 Burlington Fire Station 140 Terrace Hill Burlington	Mystic	Jm	1-25-10	1991-3	5/09	.08		.11		
#28 Reading Fire Station 267 Woburn St. Reading	Mystic	Jm	1-25-10	1991-3	5/09	.06		.10		
#29 Wakefield Fire Station 5 Oak St. Wakefield	Mystic Town of Wakefield	Jm	1-25-10	1991-3	5/09	.07		.11		
#34 Lynnfield Fire Station 55 Summer St. Lynnfield	Lynn	Jm	1-25-10	1991-3	5/09	.08		.12		
#49 Reading Take Station Lowell St. Reading	TGP	Jm	1-25-10	1991-3	5/09	.08		.11		

DISTINCT ODOR LEVEL TESTS

Performed by: Propane & Gas Conditioning Group (North)

LOCATION	Distribution System Tested	Test Conducted By	Test Date	Odorator Serial #	Odorator Calibration Date	Odorator Threshold Reading	% Gas Converted Threshold	Odorator Distinct Reading	% Gas Converted Distinct	REMARKS:
#24 Winthrop Fire Station 40 Pauline St. Winthrop	Mystic		5 pm (2.5.10)	19513	4.07	.05	.05	.10	.10	
#25 Arlington Fire Station 1 Monument Pk. Arlington	Mystic	11	11	11	11	.05	.05	.09	.09	
#26 Lexington Air Base Grenier St. Lexington	Mystic	11	11	11	11	.04	.04	.11	.11	
#27 Burlington Fire Station 140 Terrace Hill Burlington	Mystic	11	11	11	11	.05	.05	.11	.11	
#28 Reading Fire Station 267 Woburn St. Reading	Mystic	11	11	11	11	.05	.05	.09	.09	
#29 Wakefield Fire Station 5 Oak St. Wakefield	Mystic Town of Wakefield	11	11	11	11	.06	.06	.12	.12	
#34 Winthrop Fire Station 15 Summer St. Winthrop	Lynn	11	11	11	11	.03	.03	.08	.08	
#39 Reading Take Station owell St. Reading	TGP	11	11	11	11	.03	.03	.11	.11	

**Inter-office Memo
Instrumentation & Regulation NE**

To: File

From: John Barrett

Date: January 26, 2010

Subject: **228 Pleasant Street, Reading**

On Monday, January 25, 2010 at approximately 6:30 p.m. John Doherty, Senior Supervisor, Instrumentation & Regulation was notified by Gas Control regarding an incident that occurred at 228 Pleasant Street, Reading. John Doherty, Senior Supervisor, Instrumentation & Regulation, and Jacques Moron (Instrumentation & Regulation Technician) went to the site to perform odor level tests. Tests were conducted at the Reading Take Station, Lowell Street, Reading, 235 Pleasant Street, Reading and John @ Haven regulator station, Reading. These locations are located in close proximity to the incident.

The results of these tests are listed below:

Date	Time	Location	Threshold Odor Level (% Gas in Air)	Distinct Odor Level (% Gas in Air)	Test Equip. ID	Test Equip. Calibration Date	Test By
1/25/2010	8:05 p.m.	Reading Take Station Lowell Street Reading	0.04	0.10	1991-3	5/2009	J.M.
1/25/2010	8:49 p.m.	John @ Haven Reading	0.03 0.04	0.07 0.09	1991-3 1991-3	5/2009 5/2009	J.M. J.D.
1/25/2010	9:38 p.m.	235 Pleasant Street Reading	0.05 0.06	0.09 0.10	1991-3 1991-3	5/2009 5/2009	J.M. J.D.

Key to testing: J.D. – John Doherty
J.M. – Jacque Moron

cc: J. Higgins
J. Gatherum
P. Vigeant
C. Aronson
J. Barrett
M. Eagan
M. Scaparotti